UNIVERSITY OF ALBERTA

SITUATIONAL THREAT PERCEPTIONS IN COMPETITIVE ICE HOCKEY AND SOCCER

BY

©

JOHN GLEN HUNTER DUNN

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DEDICATION

This thesis is dedicated to three people. To my mother, Eileen, and to my father, Jimmy, who not only gave me continual encouragement throughout my entire studies, but who have always provided me with the spiritual and material support I have always needed.

Also in loving memory of my Grandmother, Isabelle Gunn, who passed on to her daughters the Christian values that have since been passed onto me.

Abstract

Using a perceived similarity rating scale, varsity ice hockey and soccer athletes rated the similarity of 15 sport-specific anxiety inducing game situations. Athlete ratings were based upon the reasons why threat was generally experienced. The situations for each sport, where possible, employed generic wording to facilitate direct cross-sport comparisons. Multidimensional scaling procedures revealed similar three dimensional solutions for each sport. The dimensions were labelled as Negative Certainty/Uncertainty, Ego Threat, and Controllability. Further analyses of situation clusters in the three dimensional configurations also revealed similar homogenous groupings of situations for the two sports: Fear of Failure, Fear of Injury, Negative Consequence Ego Threat, and Helplessness. Certain distinct differences were also revealed between the perceptions of athletes from the two sports. Situational characteristics unique to the nature of each of these sports were proposed to help explain these differences. In addition to the similar perceptual constructs obtained for the two sports, large individual perceptual differences were also observed across athletes both within and between-sports. The important implications for coaches and researchers in examining and accounting for individual differences are discussed. Some methodological concerns regarding the use of group-data averaging techniques in sport psychology research are also presented.

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CHAPTER 1 INTRODUCTION

The concept that an athlete's susceptibility to competitive anxiety is greatly influenced by self perceptions within specific situations is not new (Fisher & Zwart, 1982). States of over-arousal, commonly described as stress or anxiety, have been shown to adversely affect athlete performance due to the narrowing of attention and a reduction in information processing capabilities (Landers, 1980). Therefore, an understanding of the stress process is of paramount importance to coaches and athletes striving to achieve optimal performance.

Social psychologists and personality psychologists have debated for years as to whether situation factors or personality characteristics (e.g.,trait anxiety) account for the major proportion of individual behavioral variance (Endler, 1975; Sonstroem, 1984). It was not until Endler and Hunt (1966) conducted their classic study examining the relative proportion of behavioral variance accounted for by either the individual or the situation, that initial evidence was provided to dispel the claims of both factions. Using a Stimulus-Response (S-R) Inventory of Anxiousness, Endler and Hunt discovered that the proportion of behavioral variance that could be attributed solely to either the situation or the individual was relatively small. In fact, the interaction between the situation and the individual accounted for more variance than either one considered in isolation. Nevertheless, most research concerning the stimulation of anxiety during sport participation has concentrated upon the characteristics of the *athletes* as opposed to focusing on those of the *situation* in which behaviour occurs (Fisher, 1984; Hanin, 1989; Spielberger, 1989).

Endler and Hunt's findings led to the development of an interactional model for explaining behaviour (Endler & Hunt, 1966, 1968, 1969). This approach takes into account both the personality characteristics of individuals and the characteristics of the situation with which they interact. Therefore, to fully understand behaviour, information pertaining to the interaction of both personality *and* situation factors is required (Bandura, 1978; Lazarus & Averill, 1972).

From the emergence of the interactional approach came the development of so-called situation-specific trait anxiety tests (Sonstroem, 1984). Trait anxiety (A-Trait) was defined by Spielberger (1966) as an "acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively non dangerous situations as threatening" (p.17). The purpose of these situation-specific trait tests was to examine the disposition of individuals to be anxious in specific classes of situations (Laux, Glanzmann, & Schaffner, 1985).

The first example of a situation-specific trait anxiety test developed for sport was the Sport Competition Anxiety Test (SCAT) (Martens, 1977). This instrument was designed to measure what is now commonly referred to as Competitive Trait Anxiety (CTA). Simply defined, CTA is a measure of an individual's tendency to perceive situations in the competitive environment as threatening.

To further the understanding of situational anxiety, Martens, Rivkin, and Burton (1980), developed the Competitive State Anxiety Inventory (CSAI) in order to examine levels of state anxiety (A-State) in competitive settings. A-State is a momentary or transitory emotional state which varies according to the severity of threat perceptions in any encountered situations (Spielberger, 1972). The CSAI has since been further refined into the CSAI-2 which attempts to further differentiate somatic and cognitive anxiety related to competitive A-State (Martens, Vealey, & Burton, 1990).

Although the aforementioned anxiety assessment tools provide valuable information concerning the study of anxiety in competitive sport, one serious question remains unanswered. Specifically, is it legitimate for researchers to assume that these "situation specific" tools adequately examine the plethora of specific situations which athletes are likely to encounter within their competitive environments? Stated another way, can these assessment tools adequately assess the nature of anxiety in a wide variety of *specific* competitive situations.

Within any general environment, there exists numerous specific situations and stimuli (Endler, 1981). In an athletic context, the 'competitive environment' as a whole actually encompasses a large variety of specific situations which athletes encounter. When competitive trait anxiety assessment tools are employed in the overall competitive setting (or precompetitive settings as is the common use for state anxiety questionnaires), the recognition of an individual's tendency to be differentially anxious in the many varied specific situations within the sport is overlooked.

The characteristics of specific situations in different sports can encompass a distinct variety of both physical and psychological threats. Therefore, it would appear that the available assessment tools which are assumed to be situation specific may still be too general in their approach to provide useful information regarding the nature of situational anxiety. Stated another way, it may be inappropriate to use an "umbrella assessment" to determine situational anxiety levels in the overall competitive environment because the level of athlete threat perceptions will vary markedly between different types of situations.

Endler and Okada (1975), using a Stimulus Response

Inventory of General Trait Anxiousness, examined four types of A-trait situations. These included 'interpersonal' threats, threats of 'physical danger', 'ambiguous' threats and 'innocuous' threats. They discovered that for situations which had potential for physical harm, women who were rated high on the physical danger trait exhibited higher A-state reactions than women low on this trait dimension. Such a finding suggests that in order to enhance the accurate prediction of individuals' reactions to stressful situations based on their A-trait profiles, the relevant A-trait components must be congruent with the characteristics of the threatening situations under examination. This rationale is in agreement with Spielberger (1972), who suggests that researchers examining the state-trait paradigm of anxiety need to "describe and specify the characteristics of stressor stimuli that evoke the differential levels of A-State in persons who differ in A-Trait" (p.39). Thus, if no understanding of the situational characteristics is available, the dimension of A-trait to be examined in conjunction with the situation is essentially unknown.

Ultimately, one of the primary goals of psychological research is to understand and explain how individuals behave and think in the real life situations with which they interact (Magnusson, 1988). Therefore, in sport, if coaches and sport psychologists are to enhance their understanding of athlete behaviour in specific situations, a greater understanding of those situational characteristics is necessary. To this end, more systematic research into the specific situation has been suggested (Magnusson, 1982; 1985).

Mischel (1977) proposed that some attempt to classify situations is necessary to further understand the nature of situations. One approach to determine situational characteristics that can enhance classification prospects, is to analyze athletes' perceptions of threat pertaining to the specific anxiety inducing competitive situations which they frequently encounter (Magnusson, 1971). An understanding of how individuals perceive and organize these situations provides information necessary to explain their behaviour (Miller, 1963). Based upon such threat perceptions, any emerging perceptual constructs underlying the psychological meaning of situations would provide valuable information pertaining to the reasons for A-state elevations by individual athletes (Fisher, 1984).

The specific situations, both within and across sports, that athletes perceive to be anxiety inducing must initially be identified. The development of anxiety assessment inventories employing these specific situations would provide a starting point in understanding which situations are most likely to cause anxiety, and the reasons underlying the threat perceptions. Furthermore, such situation specific inventories would help explain individual athlete differences pertaining to their reactions and perceptions in similar specific situations. Thus, an understanding of why two athletes may react differently to the same situation would be enhanced. Such information is vital to coaches who frequently must decide which athletes would be best utilized in various potentially stressful game situations.

Statement of the Problem

The purpose of Study 1 was to identify the specific competitive game situations in which athletes, from a variety of team sports, typically experience anxiety. A second study objective was to determine the extent to which the physical characteristics of sport-specific situations could be arranged within a 'generic classification system'. That is, could a classification system be developed that could encompass the situations from all the sports examined?

The main purpose of Study 2 was to examine whether the typology developed in Study 1 would accommodate a new set of athlete responses. In addition, the extent to which the situations identified in the first study were truly typical, would be determined through a comparison with the responses provided in the second study.

The purpose of Study 3 was to examine the underlying psychological structures upon which athlete threat perceptions of the anxiety provoking situations were based. Specifically, five key objectives were set:

1. Determine and describe the underlying cognitive dimensions upon which threat perceptions in specific anxiety inducing situations are based.
2. Establish whether athletes within the same team (sport) perceive the same situations in a similar manner.
3. Examine individual differences among athlete perceptions and compare those to the results of group-data averaging techniques.
4. Ascertain whether athletes from hockey and soccer base threat perceptions along similar cognitive dimensions.
5. Examine whether apparently-parallel situations in soccer and hockey elicit similar perceptions with respect to anxiety production.

Delimitations of the Study

The following were the delimitations of the study:

1. For Studies 1 and 2, the sample consisted of male and female athletes competing on basketball, field hockey, ice hockey, soccer and volleyball varsity teams and equivalent elite age group teams. During Study 3, the sample was restricted to male varsity athletes competing on the ice hockey and soccer teams at the University of Alberta. Goalkeepers and goaltenders were excluded.

2. Athletes were requested to identify up to five situations that were perceived to be anxiety inducing and

typical in nature. Therefore, the citing of hypothetical situations which were rarely, if ever, encountered by most athletes, yet which are easily identifiable as anxiety inducing (e.g., taking a penalty shot in the last minute of a national championship final to win the match) received no attention in this study.

3. The instruments used in Study 3 consisted of 15 anxiety provoking situations. The objectifiable characteristics of these specific situations were selected from the self generated athlete responses obtained in Studies 1 and 2.

4. The instruments were designed to assess perceptions of anxiety provoking situations, but did not attempt to obtain absolute quantifiable levels of anxiety experienced in those situations.

5. No examination of athlete A-Trait characteristics was conducted.

Limitations of the Study

The following were the limitations of the study:

1. The validity of the situations provided by the athletes was limited to the athletes' honesty, as well as their ability and willingness to disclose the appropriate information.

2. The generalizability of the findings is limited to the team sports examined in the study.

CHAPTER 2 LITERATURE REVIEW

Stress and Anxiety: A Review of Related Theories and Measurement Inventories

Stress, as defined by Spielberger (1989), refers to the process in which an individual experiences anxiety when confronted by a stressor. A stressor is a situation that evokes the perception of physiological and/or psychological threats. Regardless of whether an objective danger actually exists, the perception of a threat will cause the individual to experience an unpleasant emotional response referred to as *state anxiety* (Landers, 1980).

Spielberger (1966) defines state anxiety (A-State) as a momentary emotional state characterized by feelings of tension or uneasiness. The intensity of A-State does not remain constant, but instead fluctuates in response to the perceived severity of the stressors encountered (Spielberger, 1989). Sarason (1980) provides the following list of some potential factors which can trigger the A-State response:

> 1. The situation is seen as difficult, challenging and threatening.
> 2. The individual sees [himself/herself] as ineffective, or inadequate, in handling the task at hand.
> 3. The individual focuses on undesirable consequences of personal inadequacy.
> 4. Self-deprecatory preoccupations are strong and interfere or compete with task relevant cognitive activity.
> 5. The individual expects and anticipates failure and loss of regard by others. (p. 6)

In addition to describing a temporary emotional state, 'anxiety' is also used to describe the tendency to perceive situations in a threatening manner (Martens, Vealey, &

Burton, 1990). Spielberger (1972) refers to this tendency as *trait anxiety* (A-Trait). Individuals high in A-Trait are more likely to experience heightened state anxiety in certain types of situations than individuals low in A-Trait (Hanin, 1980).

Early research into the construct of anxiety focused predominantly upon A-Trait characteristics and lead to the development of general trait anxiety inventories (e.g., Manifest Anxiety Scale; Taylor, 1953). However, the generality of these inventories precluded their ability to measure consistent levels of A-Trait for the same individual in different settings (Smith, Smoll, & Schutz, 1990). As a result, situation-specific A-Trait inventories were developed. Researchers utilized these more specific inventories to examine the susceptibility to experience anxiety in specific classes of situations (Hackfort & Schwenkmezger, 1989). The numerous types of anxiety that have been examined include social evaluation anxiety (Watson & Friend, 1969), test anxiety (Sarason, 1973) and speech anxiety (Lamb, 1973).

Despite the development of situation specific inventories for a variety of social contexts, researchers in sport continued to examine anxiety with general assessment tools (e.g., State-Trait Anxiety Inventory; Spielberger, Gorsuch, & Luschene, 1970). It was not until Martens (1977) developed the Sport Competition Anxiety Test (SCAT) that the first sport specific anxiety inventory was introduced. Not surprisingly, the SCAT proved to be a better predictor of A-State levels in competitive sport settings than did the general trait anxiety inventories (Martens et al., 1990). With the realisation that sport specific inventories more accurately measured anxiety in competitive settings, numerous sport specific inventories were developed. These included the S-R Sport Inventory of Anxiousness (Fisher, 1979), the Competitive State Anxiety Inventory (Martens et al., 1980), the Sport Anxiety Questionnaire (Vormbrock, 1986; cited in Hackfort & Schwenkmezger, 1989), the Sport Anxiety Interpretation Measure (Hackfort, 1986), the Sport Anxiety Scale (Smith, et al., 1990), and most recently the Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990).

In conjunction with the development of many assessment tools in the late 1960's, researchers (e.g., Liebert & Morris, 1967) began to differentiate between two types of reactions associated with anxiety: cognitive anxiety and somatic anxiety. Cognitive anxiety refers to the psychological feelings of tension, worry, and apprehension often experienced by individuals when confronted by a stressor. Somatic anxiety, on the other hand, describes physiological responses to anxiety such as elevated heart rate, sweating, shortness of breath, and noxiousness (Martens, et al., 1990). Although cognitive and somatic anxiety are believed to interact when individuals experience anxiety, research has shown that certain situations tend to evoke different levels of both components. For example, Morris and Liebert (1973) reported that subjects who received the threat of an electric shock demonstrated considerable increases in somatic anxiety, while cognitive anxiety remained generally unaffected. In contrast, they also observed that subjects in performance evaluation situations experienced minimal increases in somatic anxiety, but large increases in cognitive anxiety.

The bidimensional nature of state anxiety has been recognised in the sport domain (Le Unes & Nation, 1989). Further, Smith et al.(1990) recently suggested that the cognitive component of anxiety should be subdivided into a worry factor and a concentration disruption factor. The worry construct refers to thoughts related to self-doubt; the concentration disruption factor refers to thoughts which disrupt and distract an athlete's concentration, which in turn can adversely affect performance. The adverse effects that anxiety can have upon performance is one of the major reasons why it has been the focus of so much research attention. Specifically, if anxiety can be more fully understood, researchers will be more capable of developing strategies that enable individuals to overcome many of the problems associated with the affects of anxiety.

The Anxiety-Performance Relationship in Motor Behaviour

According to Hamilton (1977), anxiety adversely affects performance because cognitions associated with anxiety compete with information processing capabilities. If information processing capabilities are disrupted, poor decision making may result, which in turn leads to poor performance. Similarly, Schmidt (1988) discussed how high levels of arousal (closely related to anxiety) lead to increases in perceptual narrowing (Kahneman, 1973). This phenomena is described as a "narrowing of attentional focus, with a progressive elimination of input from the more peripheral aspects of the environment" (Schmidt, 1988, p. 133). Consequently, individuals may miss relevant cues which are necessary to successfully complete a task.

Considerable research has been conducted to examine the anxiety-performance relationship in sport, where efficient athlete decision making and precise execution of motor tasks are vital to successful performance. For example, Weinberg (1977) investigated how throwing performances of high and low trait anxious individuals were affected by negative feedback. The results showed that high A-Trait subjects experienced significantly greater levels of A-State than low A-Trait subjects following negative performance feedback. In addition, performance of a task by high A-Trait subjects was much poorer than low A-Trait individuals after receiving the feedback. These results indicate that high levels of A-Trait and A-State can have detrimental effects upon the performance of motor tasks.

Burton (1988) found similar results when he investigated the relationship between the level of cognitive state anxiety and swimming performance in varsity swimmers and elite youth swimmers. A significant negative linear relationship was observed between intraindividual performance times and cognitive anxiety. In other words, higher levels of pre-competitive cognitive state anxiety were associated with poorer performances.

A recent study by Prapavessis and Grove (1991) used a version of the Profile of Mood States (POMS) inventory (McNair, Lorr, & Droppleman, 1971) to examine the relationship between pre-competitive mood states of clay-target shooters and their performances on a number of occasions. The results indicated that elevated levels on the POMS 'confusion' subscale (i.e., similar to the concentration disruption construct proposed by Smith et al. (1990, discussed earlier) were significantly related to below average performances.

To determine whether the cognitive and somatic components of anxiety had different effects upon performance in sport, Gould, Petlichkoff, Simons and Vevera (1987), examined the affects of these constructs upon the performances of pistol shooters. Results showed that certain levels of heightened somatic anxiety detracted from shooting performances, but cognitive anxiety appeared to have little affect. In a more recent study, Bird and Horn (1990) examined the effects of cognitive and somatic anxiety on mental errors made during competition (inferred from performance) in female high school softball players. In contrast to the findings of Gould and his associates, Bird and Horn found that somatic anxiety was unrelated to mental errors. Cognitive anxiety, on the other hand, did appear to influence the occurrence of mental errors; individuals who were high in cognitive anxiety made more mental errors than individuals low in cognitive anxiety. The conflicting results obtained in these two studies suggest that cognitive and somatic components of anxiety can differentially affect performance depending upon the requirements of the task. Numerous other studies in golf (Weinberg & Genuchi, 1980), parachuting (Powell & Verner, 1982) and basketball (Sonstroem & Bernardo, 1982) have all demonstrated that high levels of state and trait anxiety are associated with poor performance outcomes.

Regardless of which arousal-performance relationship theory researchers advocate (e.g., Inverted U hypothesis; Yerkes & Dodson, 1908; Drive Theory; Spence & Spence, 1966; Zone of Optimal Function, Hanin, 1980), the studies discussed previously, without exception, confirm that high levels of increased anxiety can adversely affect performance. Although these findings showed detrimental performance effects in a variety of different settings, on the whole the studies failed to extensively examine the specific characteristics of the situations to determine exactly why anxiety was experienced.

Situation Analysis

Smith et al. (1990) proposed that competitive sport anxiety is partly a function of the task demands imposed by the specific game situations encountered by athletes. Numerous researchers have also suggested that if athlete behaviour is to be more fully understood, studies must examine personality characteristics and include a systematic analysis of the specific competitive situations in which the behaviour occurs (Hackfort & Spielberger, 1989; Hanin,1989; Spielberger, 1989). Even advocates of the interactionist approach to the study of behaviour (see Endler & Hunt, 1966, 1969) have suggested that more attention needs to be focused upon the situational characteristics within interactionist designs (e.g., Ekehammar, Magnusson, & Ricklander, 1974;

Endler, 1980; Magnusson & Stattin, 1981; Sells, 1963).

Situation definitions. If research is to be conducted into the characteristics of situations, some operational definitions must first be provided. Endler (1981) suggests two levels of generality which apply to situation characteristics: the macroenvironment and the microenvironment. The macroenvironment is defined as the overall environment in which individuals behave. The microenvironment, on the other hand, refers to the many specific situations which individuals encounter within the macroenvironment. Endler makes further distinctions between the terms environment, situation, and stimuli. The environment is similar to the previously defined macroenvironment, whereas the situation is defined as the "momentary or transient background" (p.364) in which behaviour occurs. The stimuli were defined as the specific "elements within the situation" (p.364). An example from sport can be used to clarify Endler's definitions. 'Competitive sport' represents the macroenvironment, while the 'specific sport' in which the individuals participated (e.g., basketball, ice hockey, soccer, etc.) represents the environment. Within a basketball environment, the 'free throw' is an example of a situation. The relevant stimuli within the situation might include the score, the amount of time remaining in the game, the size and nature of the audience, and the athlete's perception of his/her free throwing ability based on past experiences.

Situation structure. Despite the fact that social psychologists are primarily interested in the effect of situations on behaviour, few schematic representations have been developed to portray the structure of situations (Baumeister & Tice, 1985). In many environments, there may not appear to be any real structure about which situations can be arranged, nonetheless, Magnusson (1988) argues that some sort of "order and lawfulness" does exist within the many complex environments of ever changing social situations (e.g., competitive sport). One useful way to create some structure to the seemingly complex environment of situational characteristics is accomplished through the development of classification systems (Cvetkovich & Earle, 1985).

Sokal (1974) defines classification systems as the "ordering or arrangement of objects [e.g., situations] into groups or sets on the basis of their relationships" (p. 1116). Many classifications systems are based upon the observable physical characteristics of the stimuli, such as the organisation of animals (e.g., mammals, reptiles, insects, etc.) in the biological sciences. In psychology, however, researchers (e.g., Endler & Magnusson, 1976) advocate the organisation of situations based upon how individuals perceive them. This is considerably more complex than the classification of situations based on their physical characteristics as the psychological constructs upon which perceptions are based must first be identified.

Magnusson (1971) argues that individuals represent objects within a 'cognitive space' and that the closer objects (or situations) are arranged within that space, the more similar they are perceived to be. Further, if situations are closely located within an individual's space, they can be considered similar in terms of the psychological dimensions upon which the perceptions are based. Using differences in the 'cognitive space locations' of similar situations observed across individuals, the classification of individuals can also be made (Magnusson, 1981).

The classification of situations based upon perceptual similarities/differences among individuals introduces many potential problems. For example, the stability of the cognitive dimensions upon which perceptions are based is often unknown. If changes do occur, the validity of a classification system based on these perceptions would be extremely poor. This may be a real concern because the experiences which an individual undergoes in a situation, both positive and negative, can severely affect perceptions towards similar situations in the future.

Magnusson (1985) has also conducted a study which demonstrated how developmental factors influenced the threat perceptions of children towards various stressors. Three groups of children (aged 11-12, 14-15, 17-18 years) were asked to rate the similarity of a variety of threatening situations. Results showed that similarities based upon the manifest characteristics of situations (i.e. central objectively determinable physical characters) decreased with increasing age. However, similarities based upon the latent characteristics of the situations (i.e. psychological constructs of shame, guilt, separation etc.) increased with increasing age. These findings reveal the need for researchers to be cautious when interpreting perceptual similarity ratings across different age groups; a group of situations perceived to be similar by eighteen year olds may be perceived quite differently by younger children. Alternatively, the younger children may also perceive the situations to be similar, but base their perceptions on completely different psychological constructs. Therefore, the psychological meaning which individuals assign to situations must be clearly identified if behaviour in those situations is to more fully understood (Fisher, 1984).

Factors affecting group homogeneity and situation perceptions. The homogeneous nature of a group is likely to affect the perceptions of group members toward certain situations. For example, it has been established that differences in experience with particular settings can induce different threat perceptions among group members.

Jorna and Gaillard (1988) conducted a study which examined the performance of novel memorization and recognition tasks by experienced and inexperienced divers. There were no performance differences observed between the two groups when the tasks were carried out on dry land. However, when the tasks were performed in a shallow darkened pool, the experienced divers performed significantly better than the inexperienced divers. It appeared that the amount of experience individuals possessed with underwater conditions differentially affected their perceptions of threat when exposed to these conditions.

The environment to which individuals are accustomed is likely to influence perceptions towards particular types of situations within that environment (Stokols, 1981). Endler (1981) argues that group perception and reaction similarities to certain specific situations within the same environment are a result of continual exposure to those situations. This implies that perception and reaction differences between groups from different environments are a result of exposure to different types of stimuli imposed by their respective environments.

The effect of the environment on perceptions of anxiety has also been approached from a cross-cultural perspective. Magnusson et al. (1976) examined cross cultural differences in reactions to specific anxiety inducing situations by teenagers from three countries of diverse cultural backgrounds. Significant cultural differences in reactions to identical anxiety inducing situations were observed. From these findings it can be inferred that the perceptions of individual children toward similar situations were influenced by the culture or environment in which they lived.

If the 'type of sport' in which individuals compete was considered analogous to the 'culture' variable in the study by Magnusson et al., the question exists as to whether the environments which different sports provide, can produce different effects upon the perceptions of athletes from these sports. Specifically, do different sport environments differentially affect athlete perceptions towards similar types of threatening situations?

The effect of different sport environments on the perceptions of threatening situations by athletes has been investigated in several studies. Silva (1983) examined how athletes' perceptions toward the acceptance of rule violating behaviour were affected by the types of sports in which they participated. Athletes were grouped according to sport types: non-contact (e.g., volleyball), contact (e.g., soccer), and collision (e.g., ice hockey). After viewing slides depicting rule violating behaviours from a variety of team sports, the athletes rated their perceptions of the acceptability of each behaviour. Results indicated that athletes competing in high collision sports tended to have a greater tolerance for the legitimacy of rule violating behaviour than athletes in sports where low levels of collision are experienced.

In another study which examining the effects of different types of sport environments, Bredemeier, Weiss, Shields and Cooper (1986) studied the relationship between moral development and sport participation in children. Results showed that subjects who participated in high contact sports tended to report more aggressive behaviours than children who competed in lower contact sports, in both the sports environment and in everyday life. Thus it appears that, to a certain degree, athletes competing in similar sports or similar sport environments, share similar perceptions towards certain situations and issues.

Situational threat perceptions. Numerous studies in social psychology have identified a variety of perceptual characteristics which appear to underlie individuals' threat perceptions towards specific anxiety inducing situations. The most prominent characteristics that have been identified have been labelled ego threat (Kendal, 1978), physical danger (Endler, 1977) threat of punishment (Ekehammar, Magnusson, & Ricklander, 1974), social evaluation (Krahé, 1986) and inanimate threat (Magnusson & Ekehammar, 1975).

Although researchers in sport psychology have also identified a variety of psychological constructs upon which competitive threat perceptions are based (e.g., fear of failure-feelings of inadequacy, Gould, Horn, & Spreeman, 1983; loss of control, Kroll, 1979; fear of evaluation, Passer, 1983), relatively few studies have systematically examined the characteristics of specific within-game anxiety inducing situations. The only two studies to systematically analyze specific situational characteristics in competitive sport were conducted by Fisher (1979), and Fisher and Zwart (1982). Both studies examined the psychological constructs upon which athlete threat perceptions towards specific anxiety inducing basketball situations were based. Four main perceptual constructs were identified with the use of factor analytic and multidimensional scaling procedures: degree of anticipation, ego threat, outcome uncertainty, and outcome certainty. The generalisability of Fisher's findings to other sports, however, is very limited because similar studies in other sport environments have not been conducted.

Conclusions

The concept of anxiety in competitive sport has been the focus of much research. In addition, the results from many studies reviewed showed that certain levels of state anxiety can adversely affect athletic performance. These debilitating performance effects have been recognised by coaches for years. Some coaches, based upon their previous personal experiences, will even attest to knowing the reasons why athletes experience anxiety in specific situations (Hackfort & Spielberger, 1989). Unfortunately, such conjecture is unlikely to enhance a coach's ability to predict how athletes will respond to similar (and different) situations in the future. To a certain degree, sport psychologists have also been guilty of claiming to understand why anxiety is experienced by athletes in certain situations. Anxiety-related sport psychology research has focused predominantly upon the personality characteristics of athletes, but has failed to account for the characteristics of the specific situations in which behaviour takes place (Fisher, 1984; Spielberger, 1989). As a result, no definitive explanations can be proposed to account for certain athlete responses, since a large part of the stress process has not been considered or accounted for (1.e., the situation/stressor characteristics). If coaches are to be given the opportunity to enhance their ability to predict how athletes will respond in certain situations, more information regarding specific game-situation characteristics is required. This may be achieved, as the literature suggests, with the development of game-situation classification systems and with more systematic analyses into the psychological meaning which athletes assign to the situations they encounter.

CHAPTER 3 STUDIES 1, 2 AND 3; METHODS AND RESULTS

Study 1

Purpose

The first study was primarily exploratory in nature. The purpose of this phase was two fold: (a) to identify competitive game situations perceived by elite athletes as being typical and anxiety-inducing, and; (b) to classify the identified situations through inductive processes to determine the extent to which a systematic classification system emerges.

Method

Subjects

A total of 114 athletes (72 males and 42 females) from nine elite university, college and community teams in five team sports served as subjects in Study 1 (see Table 1). The mean age was 20.8 years and subjects reported an average of 8.1 years playing experience in their affiliated organized sport.

Instrument

A two-part questionnaire (see Appendix A) was developed with part 1 requesting demographic and playing information (e.g., age, experience, positions, etc.). Part 2 requested that the subjects identify and describe up to five situations in their sport which are typically encountered and which personally produce increased levels of anxiety during competition. A brief rationale for the anxiety elevation was also solicited.

Anxiety was operationally defined as "a state of mental uneasiness or distress" on the questionnaire and this operational definition was reinforced verbally prior to questionnaire completion. The confidentiality of responses from the coach was also affirmed both verbally and on the instrument.

Table 1

Means of Age and Experience of Subjects

		Gender					
		Male			Female		
Team	Study	n	Age	Experience	n	Age	Experience
Basketball	1	20	21.3	7.1	11	20.5	8.7
	2	29	20.7	6.7	13	19.9	9.1
Field Hockey	1				11	23.5	6.7
	2				16	21.1	3.5
Ice Hockey	1	40	20.8	13.2			
	2	42	20.4	13.2			
Soccer	1				17	20.8	8.2
	2	16	22.6	13.5	16	19.7	9.3
Volleyball	1	12	21.3	7.6	3	20.0	5.3
	2	12	20.2	7.0	9	20.5	6.2

Note. Age and experience expressed in years.
All teams are university, varsity, with the exception of one male basketball team and one ice hockey team.

Procedures

The questionnaire was administered by the researcher at a time convenient to the team and coach (e.g., team meeting, after practice, etc.) during the latter half of the regular season. As a preamble to receiving the questionnaire, subjects were informed of the general nature of the study and encouraged to cite only those anxiety-eliciting situations 'typically' encountered in their athletic experience. Thus, the use of rare, hypothetical situations (e.g., final moments of the championship game) were to be avoided.

To illustrate what might constitute "typical" situations, five examples were verbally provided from a sport in which the athletes were not competing. These examples were intended to illustrate the great diversity of possible responses and reflected varied situations concerning physical characteristics (e.g., injury), responsibility (e.g., coverage), opponents (e.g., skill levels), coaching (e.g. personal decisions) and officiating. It was emphasized that these examples were samples only and were provided with the intention to stimulate, rather than restrict, any responses an athlete may wish to offer. The examples were quite specific and easy to understand. Prior to questionnaire administration the researcher again reinforced the confidentiality of all responses from the coach.

Data treatment

The data analysis was conducted using an inductive reasoning technique commonly referred to as "clustering" in the qualitative literature (Krippendorff, 1980; Miles & Huberman, 1984). Patton (1980) describes the inductive process as one which permits the creation of clusters of common themes to emerge from the data. This is in contrast to a deductive methodology which requires the data to be fitted into pre-existing categories. Scanlan, Stein and Ravizza (1989, 1991) refer to the process as an "inductive content analysis" and liken it to a conceptual factor analytic technique. Indeed, the data analysis procedure employed in the present study was very similar to the process adopted by Scanlan et al. (1989) in their investigation of enjoyment sources for elite figure skaters.

In accordance with the clustering protocol suggested by Krippendorff (1980), an attempt was made to develop mutually exclusive categories whereby the differences in the situational characteristics of each cluster were clearly identifiable. All responses were initially grouped by team and according to their most prominent features (e.g., scoring opportunities, substitutions, officiating decisions etc.). This procedure led to the creation of preliminary categories of responses which clustered together around common salient themes. The poorest fitting categories were then re-examined, and either redefined, collapsed or altered in some way so that ill-fitting responses were allocated to more appropriate categories or were used to generate new, independent categories. This problem of "convergence" (Patton, 1980) was reconciled by the continual repetition of the aforementioned procedure until all responses were assigned to an appropriate category (Guba, 1978).

In those instances where a response clearly contained two messages (e.g., "Being substituted off. Wonder what I did wrong."), the response was simultaneously classified into two categories. In this example the anxiety source may be either the replacement by substitution or the lack of clear feedback received from the coach. Both these characteristics fell within the same major category (Coach Related) but related to different dimensions of the general theme.

Guba (1978) suggested that the degree to which the resulting classification system reflects a reliable accommodation of responses should be examined. Two independent coders were, therefore, asked to classify one randomly selected subset of original responses (n=98) according to the categories provided. Kappa coefficient (Cohen, 1960) was used to determine inter-rater agreement for the first two classification levels. These included the major level 1 categories (e.g., ongoing game situations), and the main subcategory level 2 groupings (e.g., offense, defense etc.).

The clusters and categories of situations can be displayed in tree-like diagrams called 'denrograms' that provide a graphical representation of how the data is organized and at which levels in the typology the situations are either combined or separated (Miles & Huberman, 1984). Figure 1 provides an example of an offensive denrogram for ice hockey.

Finally, upon completion of the classification process for each team and sport, an effort was made to categorize responses across teams and sports to determine the extent to which a generic system of categories was viable. This process involved an examination of the salient features of each set of responses for each of the team/sport settings.

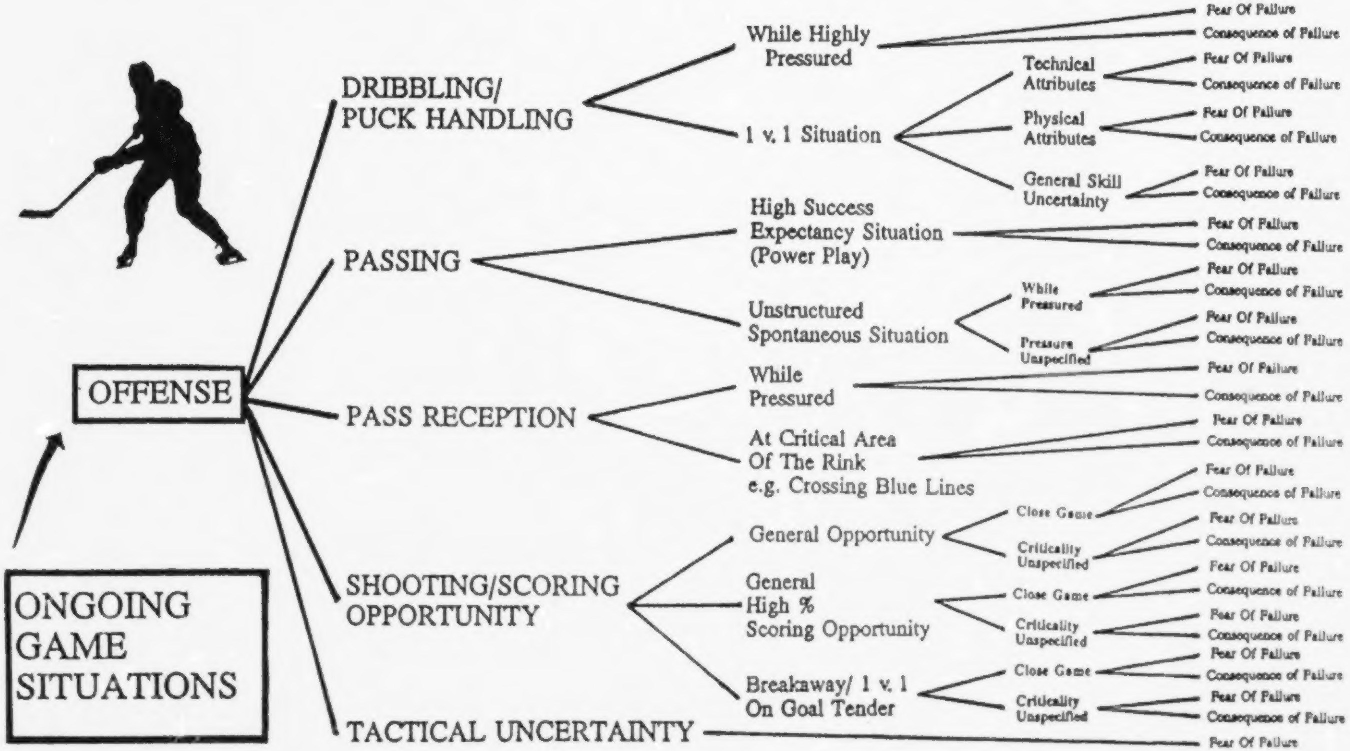
ONGOING GAME SITUATIONS
OFFENSE
DRIBBLING/ PUCK HANDLING
While Highly Pressured
Fear Of Failure
Consequence of Failure
1 v. 1 Situation
Technical Attributes
Fear Of Failure
Consequence of Failure
Physical Attributes
Fear Of Failure
Consequence of Failure
General Skill Uncertainty
Fear Of Failure
Consequence of Failure
PASSING
High Success Expectancy Situation (Power Play)
Fear Of Failure
Consequence of Failure
Unstructured Spontaneous Situation
While Pressured
Fear Of Failure
Consequence of Failure
Pressure Unspecified
Fear Of Failure
Consequence of Failure
PASS RECEPTION
While Pressured
Fear Of Failure
Consequence of Failure
At Critical Area Of The Rink e.g. Crossing Blue Lines
Fear Of Failure
Consequence of Failure
SHOOTING/SCORING OPPORTUNITY
General Opportunity
Close Game
Fear Of Failure
Consequence of Failure
Criticality Unspecified
Fear Of Failure
Consequence of Failure
General High % Scoring Opportunity
Close Game
Fear Of Failure
Consequence of Failure
Criticality Unspecified
Fear Of Failure
Consequence of Failure
Breakaway/ 1 v. 1 On Goal Tender
Close Game
Fear Of Failure
Consequence of Failure
Criticality Unspecified
Fear Of Failure
Consequence of Failure
TACTICAL UNCERTAINTY
Fear Of Failure

Figure 1. Offensive denrogram for ice hockey responses.

Results

Of the 465 responses provided, 24 were jointly categorized, yielding a total of 489 anxiety-inducing situational responses. Kappa coefficients for the two independent coder's versus the original response (n=98) classification were .97 for the four main categories and .91 for the 16 level 2 subcategories. These coefficients indicate excellent inter-rater reliability at both levels (Bakeman & Gottman, 1986). Of the few classification discrepancies, most were due to the unclear nature of some of the responses as opposed to a lack of comprehension of the system itself. Due to the confidential nature of the results, follow-up interviews could not be conducted to clarify those responses where discrepancies in rater interpretation occurred.

The inductive classification procedures with all responses led to the emergence of four level 1 categories of anxiety-inducing situations. A review of Figure 2 will help to illustrate the types of responses which were received and clarify their classification.

Category/Subcategory **Response quotes**

I. Ongoing game play situations

  A. Offensive "I've got a breakaway or 1 vs 1 on goalie. This is a situation in which the player should score." (Soccer)

  B. Defensive "Passing after shanking a ball. Confidence hurt a bit and I know the next ball will be coming to me." (Volleyball)

  C. Offensive\Defensive nature unspecified "One on one. You're on your own against this person, Who's better?" (Field Hockey)

  D. Injury "Controlling the puck along the boards in your own end when the defenseman is pinching down. Possibility of getting hurt." (Ice Hockey)

Figure 2 Actual responses and their classification (cont.).

Category/Subcategory Response Quotes

II. Game-score-time criticality

A. Stoppages "Free throw situations in tight game. Sometimes I feel that I'd better not miss or we would lose the match." (Basketball)

B. Pregame "Before the game not knowing how the other team plays. I worry about my performance and whether I will be able to get into the game quickly and do well." (Soccer)

C. Within game flow "We are losing a match and must win this game or we lose the entire match. Every mistake seems more serious than usual because it is our last chance." (Volleyball)

III. Coach related situations

A. Personnel decisions affecting the individual "Lack of playing time for reasons other than fouls. Want to play as much as possible and have worked hard to do so." (Basketball)

B. Tactical decision conflicts "Coach putting out certain players for a big play. I feel they are the wrong players for the situation." (Ice Hockey)

C. Performance feedback "Coach giving me **** for a bad play. Don't like being singled out for a mistake." (Ice Hockey)

IV. Miscellaneous situations

A. Audience "Parents and friends and tons of fans watching a good game. Pressure not to look bad." (Soccer)

B. Officiating "Poor umpiring. You rely on the umpire to call the play and when they don't it becomes very frustrating." (Field Hockey)

C. Team mates "Non intense performances. I always try to give 100% and it makes me very angry and frustrated when other people in the team are not putting in the same effort." (Basketball)

D. Opponents "Being matched up against their best hitter in front row. Feel great responsibility to execute." (Volleyball)

Figure 2 (cont.). Actual responses and their classification.

A brief review of the elements contained in each of the four major categories is useful. Ongoing Game Situations (OGS) included only those situations occurring while the ball/puck was still in play. Four subcategories emerged, two of which (offensive and defensive situations) contained about 85% of the ongoing game situation responses. Stoppages and restart situations were often cited and comprised the majority of the responses in the second major category, Game Score/Time Criticality (GSC). The primary focus of the GSC category was on conditions of score, time or game importance. Stoppage (e.g., face off) responses were generally qualified by temporal or score considerations and constraints. Coach Related Situations (CRS) reflected any reported situations that were considered to be under the direct or indirect influence of the coach. The fourth, and final, main category was labelled Miscellaneous Situations (MS) and accounted for responses that were discernable in content but which did not fit under the three previous categories. The major categories and their associated subcategories are shown in Table 2 along with the absolute and relative frequencies of responses accommodated by each.

The results of the classification process did appear to suggest a system of umbrella categories within which the sport specific responses seemed to conform. Obviously the more specific an actual response, the more likely it appeared to be unique. Yet, when the essential conceptual features were examined (e.g., good scoring chance anticipated) there emerged the overriding types of situations which manifested themselves differently in different sports but which retained the generic commonality of their category.

Table 2.

Categorization of Typical Anxiety Inducing Situations: Response Frequencies and Proportions of Phases 1 and 2

			Sport									
	Combined Sports		Basketball		Field Hockey		Ice Hockey		Soccer		Volleyball	
Nature of stressful situation	n1(%)	n2(%)	n1(%)[c]	n2(%)	n1(%)	n2(%)	n1(%)	n2(%)	n1(%)	n2(%)	n1(%)	n2(%)
I. Ongoing game play situations	164(33)[a]	344(49)										
A. Offensive	76(46)[b]	141(41)	21(15)	41(22)	7(11)	6(8)	24(17)	28(16)	9(13)	46(29)	15(21)	20(20)
B. Defensive	65(40)	144(42)	10(7)	15(8)	9(14)	25(31)	20(14)	44(25)	13(18)	41(26)	13(19)	19(19)
C. Offensive/defensive nature unspecified	14(9)	24(7)	1(1)	14(8)	2(3)	5(6)	3(2)	1(.5)	5(7)	2(1)	3(4)	2(2)
D. Injury-related situations	9(5)	35(10)		6(3)		7(9)	8(6)	16(9)	1(1)	5(3)		1(1)
II. Game/score/time criticality situations	141(29)	144(20)										
A. Stoppages	78(55)	91(63)	22(16)	25(14)	22(35)	15(19)	4(3)	14(8)	13(18)	22(14)	17(24)	15(15)
B. Pregame	18(13)	20(14)	7(5)	10(5)		2(3)	6(4)	5(3)	3(4)	2(1)	2(3)	1(1)
C. Within game flow	43(31)	33(23)	5(4)	3(2)	2(3)		27(19)	21(12)	6(8)	6(4)	3(4)	3(3)
D. Post game	2(1)		1(1)						1(1)			
III. Coach related situations	101(21)	111(16)										
A. Personnel decisions affecting individual	56(55)	56(50)	27(19)	17(9)	7(11)	4(5)	11(8)	10(6)	7(10)	11(7)	4(6)	14(14)
B. Tactical decision conflicts	17(17)	14(13)	9(6)		1(2)	2(3)	3(2)		1(1)	4(3)	3(4)	3(3)
C. Performance feedback	28(28)	41(37)	13(9)	13(7)	4(6)	6(8)	5(3)	3(2)	3(4)	5(3)	3(4)	14(14)
IV. Miscellaneous situations	83(17)	104(15)										
A. Audience	23(28)	13(12)	5(4)	2(1)			15(10)	6(3)	1(1)	3(2)	2(3)	2(2)
B. Officiating	24(29)	32(31)	6(4)	15(8)	3(5)	1(1)	13(9)	14(8)	2(3)	1(1)		1(1)
C. Team mates	17(20)	28(27)	10(7)	13(7)	1(2)	2(3)	1(1)	6(3)	3(4)	4(3)	2(3)	3(3)
D. Opponents	16(19)	30(29)	4(3)	11(6)	5(8)	4(5)		6(3)	4(6)	7(4)	3(4)	2(2)
B. Other	3(4)	1(1)				1(1)	3(2)					

Note: Number of responses and percentages for Phase 1 = n1(5), and Phase 2 = n2(%).

[a] Combined - sports superordinate category percentages of total responses within each of the four major categories for Phase 1 (n = 489) and Phase 2 (n = 703).

[b] Combined - sports subcategory percentages of responses within each subcategory.

[c] Sport - specific subcategory percentages of total responses within each sport.

Total responses within each sport for Phases 1 and 2 respectively were; Basketball = 141, 185; Field Hockey = 63, 80; Ice Hockey = 143, 174; Soccer = 72, 159; Volleyball = 70, 100.

The important question as to whether the categories, and indeed, the response patterns revealed in this study are truly _typical_ required further investigation. Glasser and Straus (1967) suggested that the "theoretical saturation" (p. 112) of the typology must first be established to determine its effectiveness. In other words, would the established categories adequately accommodate the responses of another, or even the same, group of athletes on other occasions? Were these actually _typical_ situations or were they highly specific to this group of athletes at this specific time? The second study was completed in order to address these issues.

Study 2

Purpose

The primary purpose of Study 2 was to test the compatibility of the typology developed in Study 1, with a new set of responses which were generated in the same manner as those upon which it was based. However, the relative stability of each category with regards to the distribution characteristics of responses between the two study phases was also of interest. Specifically, the extent to which the situations identified as typical in Study 1 were similar to those identified as typical in Study 2 was examined.

Method

Subjects

A total of 153 athletes (97 males and 56 females) from elite varsity and community teams served as subjects. The same teams that were tested the previous season in Study 1 were included in this phase, with 54 individuals completing the questionnaire for a second time. One additional male varsity soccer team was also tested. The demographic characteristics of each team are again illustrated in Table 1. The mean age of the athletes across all sports was 20.6

years, and an average of 9.2 years experience competing in their respective sport was reported. The elite nature of the two non-university teams (college basketball and AAA midget ice hockey) was evident with both teams reaching their respective national championship finals at the conclusion of their regular seasons.

Procedures

The identical testing protocol established in Study 1 was adopted in this second study, with subjects receiving the same set of instructions and completing the same testing instrument. All teams were tested at team meetings approximately half way through their regular seasons. The only modification to the testing procedure was the addition of one questionnaire item determining whether athletes had taken part in the study the previous year. In contrast to the inductive methods of analysis employed in Study 1, responses in Study 2 were classified according to the previously established categories from the first phase.

Results

Again, 28 of the 675 responses were jointly categorized providing a total of 703 situations. Although numerous specific situations unique to the second phase were cited by the athletes, the ability of the classification system to appropriately accommodate these responses was not affected at the first three levels. It was only at the highly specific, subordinate level of the sport type (e.g., hockey vs basketball) classifications where alteration, usually in the form of expansion, was required.

A comparison of the response patterns reflected by the distributions and rank orders of categories from both phases (see Table 2) highlights the stability of many of the categories. The four main categories have the same rank order for both phases in terms of their percentage contribution to the overall number of situations cited, with ongoing game situations (OGS) most frequently cited, followed by game score criticality (GSC), coach related (CRS) and miscellaneous situations (MS). Similarly, all of the GSC and CRS subcategories maintained their rank order of percentage contribution to their respective categories. It seems logical to infer that the greater number of responses in a category reflects its relative overall importance. That is not to say that for all athletes the most traumatic situations occur in ongoing game situations, but rather suggests that for many athletes anxiety is most frequently encountered during ongoing or continuous play.

An analysis of the Study 2 response patterns provides support for the stability of the classification system developed in Study 1. The anxiety-inducing situations reported by athletes were usually readily accommodated and even the distribution of situations resembled that of the previous year. It therefore seems reasonable to conclude that these categories and subcategories do represent the kind of situations that are truly typical sources of anxiety.

Study 3

Purpose

The purpose of Study 3 was primarily to deal with the following five issues.

1. Determine and describe the underlying cognitive dimensions upon which threat perceptions in specific anxiety inducing situations are based.

2. To establish whether athletes within the same team (sport) perceive the same situations in a similar manner.

3. To examine individual differences among athlete perceptions and compare those to the results of group-data averaging techniques.

4. To ascertain whether athletes from hockey and soccer base threat perceptions along similar cognitive dimensions.

5. To examine whether apparently parallel situations in soccer and hockey elicit similar perceptions with respect to anxiety production.

Method

Subjects

Permission to contact the athletes was obtained from the head coaches of the ice hockey and soccer varsity teams at the University of Alberta. A total of 23 male hockey athletes (mean age, 22.3 years; mean playing experience at varsity level, 2.8 years), and 15 male soccer athletes (mean age, 22.4 years; mean playing experience at varsity level, 2.7 years) served as subjects in the study. Goaltenders and goalkeepers were excluded from the sample because athletes playing in these positions are usually prevented from encountering many of the situations that were included in the inventory.

Instrument

Stimuli sampling. Magnusson (1971) suggested that one major inadequacy of research examining the hidden dimensionality of individual perceptions towards situations was the lack of attention given to the systematic sampling of the stimuli themselves. A systematic attempt to overcome this deficiency was, therefore, made in the present study.

Fifteen specific anxiety inducing competitive situations were systematically selected to represent each sport. Forgas (1976) suggested that the selection of stimuli must be representative of those encountered by respondents to enable adequate assessment of their cognitive structures. The situations were, therefore, chosen from the self generated athlete responses contained within the categories established in Studies 1 and 2. The selection of athlete generated situations ensured that the stimuli were relevant to the athletes being studied (Pervin, 1976). Furthermore, Davison (1983) states that sampling from an existing taxonomy helps to ensure that the stimuli selected are "representative of the stimulus population" (p. 41).

The situations were chosen according to a subjective analysis of their potential to reflect the characteristics of previously identified psychological constructs. Those characteristics previously cited in the extant literature have been tentatively labelled ego threat (Magnusson & Ekehammar, 1978), outcome uncertainty, negative outcome certainty (Fisher & Zwart, 1982; Martens et al., 1990), and threat of pain (Ekehammar, Magnusson, & Ricklander, 1974). However, the existence of other possible 'psychological constructs' (e.g., helplessness), was not discounted.

The systematic selection of the number of situations chosen from each of the four main categories (established in Studies 1 and 2) was also attempted. The number of situations chosen from any single category reflected the proportionate number of situations from the entire sample that were contained within that category. For example, if a category contained 50% of athlete responses, then half of the situations chosen for inclusion within the inventory were selected from that particular category.

A combined total of 275 situations were provided in Studies 1 and 2 by the hockey and soccer athletes. The *Ongoing Game Play* category contained over half the responses (n=144). Almost one quarter of responses (n=65) were located within the *Game Score/Time Criticality* category. The remainder of the situations cited by the athletes were equally distributed within the *Coach Related* (n=33) and *Miscellaneous* (n=33) categories. Therefore, as near as possible, those proportions were reflected in the 15 selected stimuli situations.

To establish the face validity of the selected situations, the head coaches and assistant coaches of the teams were asked to provide their interpretations of the situations and to reflect upon the clarity of the written descriptions for the athletes.

Stimuli presentation. The most common method used to obtain direct dissimilarity judgements is the '*Category Rating Technique*' (Davison, 1983). Such a technique requires that subjects rate the degree of perceived similarity or dissimilarity between pairs of stimuli along a bipolar multichotomous interval scale often consisting of six to nine categories (Davison, 1983). Further, Green, Carmone and Smith (1989) suggest that the scale should consist of an undifferentiated line that is anchored by two bipolar descriptors and, therefore, avoids the use of continuous verbal descriptors along the entire scale.

The category rating technique utilised in the present study consisted of a scale bounded by bipolar descriptors. However, rather than using a continuous undifferentiated line, the scale was comprised of a continuum with equal intervals, as suggested by Schiffman, Reynolds and Young (1981).

Ekehammar and Magnusson (1973) note that this type of methodology has certain distinct advantages for studying the nature of stressful situations. First, because the method only requires respondents to rate the perceived similarity of situations, the athletes are not likely to view the technique in a threatening manner. Stated another way, athletes will be unlikely to feel that so-called competitive weaknesses (e.g., admitting fear of encountering situations in which the potential for injury exists) will be discovered by the researcher. Therefore, the likelihood that athletes would give false responses was reduced. Second, Ekehammar and Magnusson suggest that even raters who are not familiar with the technique encounter little difficulty with its use.

Stimuli ordering. The order in which stimuli are presented within an inventory can influence subject perceptions and judgements towards individual stimuli and pairs of stimuli (Torgerson, 1958; Tversky, 1977). To prevent any type of presentation order effect, some sort of randomized presentation design is preferred (Davison, 1983; Ross, 1934; Torgerson, 1958; Tversky, 1977).

Ross (1934) developed a method of presenting pairs of stimuli so that the order of presentation balances not only *Space Effects* (i.e., the effect of presenting a stimulus as the first or second stimulus across a variety of paired comparisons) but also *Time Effects* (i.e., the ordering effects of stimulus pair presentation). Ross's method is commonly referred to as 'Ross Ordering' (Davison, 1983).

To balance space effects, Ross Ordering ensures that for an odd number of stimuli, each stimulus will appear an equal number of times as the first stimulus in a pair as it will the second (Ross, 1934). Further, to balance for time effects, the method achieves the optimum order of presentation for each stimulus by ensuring that each stimulus is equally spaced throughout the list of paired comparisons. (The reader is referred to the optimal order for presentation of pairs table located in Appendix B).

Procedures

Data collection took place at team meetings scheduled by the coaches. The average completion time for the inventory was approximately 35 minutes.

The inventory consisted of three parts (see Appendix C). Part 1 requested demographic information including age, playing position, and playing experience.

Part 2 required the completion of 105 paired similarity comparisons. To ensure that subjects rated the situations along the same discriminable attribute (Torgerson, 1958), they were asked to judge the similarity of situations according to the reasons *why* anxiety is experienced (i.e., perceived threat). To ensure that athletes understood the concept of threat perception, instructions were provided both verbally and in writing (see instructions in Appendix C). In addition, athletes were informed that each situation was to be considered in the context of taking place at a crucial stage of an important match. This was done to standardize athlete perceptions concerning the importance of the outcome in all situations.

Davison (1983) notes that subject judgements about the stimuli can vary depending upon what the subject expects to be included. To standardise such expectancies across subjects, Davison suggests that after presenting the initial instructions subjects should be provided with a written list of all the situations. This was done so that subjects subjects commenced with the paired similarity estimates only after becoming familiar with all of the situations.

Part 3 requested athletes to rank the degree of anxiety experienced across the 15 situations. Upon completion of the paired comparisons, athletes ranked each of the situations according to the level of anxiety experienced in each situation. A ranking of 1 was given to the situation which induced the most anxiety, and 15 to that which produced the least anxiety. Tied ranks were not permitted.

In order to establish the stability of athlete perceptions, eight athletes were randomly selected to be retested approximately two months after the initial testing.

Data Treatment

Paired comparisons. The direct similarity ratings obtained from each athlete were transferred to individual similarity matrices. These matrices were then analyzed with the use of a multidimensional scaling technique (see Tucker

& Messick, 1963) to determine the underlying psychological dimensions upon which threat perceptions were based.

The aim of an MDS analysis is to produce a visual representation of the data based upon the Euclidean distances between data points (i.e., the stimuli). The points are presented in a geometric configuration which displays the underlying structure in the data (Kruskal & Wish, 1978). The task of the researcher is then to interpret the dimensions which encompass the spatial representation of the stimuli, and/or interpret the clusters into which the stimuli group (Davison, 1983; Shepard, Romney, & Nervole, 1972).

Multidimensional scaling techniques were preferred over other group aggregation scaling methods, such as factor analytic models (e.g., Gorsuch, 1983) because they permit the analysis of interindividual variability. One problem with the 'aggregation' approach, is that the findings are frequently generalized to the entire population from which the sample was taken. In other words, data obtained from each individual is combined to form a single group data matrix; the matrix is then analyzed and the findings are generalized to the 'average' individual within the group (Tucker & Messick, 1963). Therefore, if such an approach is utilized, the researcher is tempted to assume that all the people within the group behave in a very similar manner (Bouffard, 1991). Although the 'group design' is convenient for determining general characteristics of groups, it oversimplifies the real world because no attempt is made to examine or account for individual differences.

Bouffard (1991) states that individual differences across subjects (i.e., interindividual variability) are frequently viewed as "noise or nuisance to be eliminated or controlled" (p.4). Rather, individual differences should be treated as sources of additional information and examined accordingly.

Situation ranks. The anxiety severity rankings were utilized to determine if athletes viewed similar types of situations with similar degrees of severity. The use of the rankings also provided some information pertaining to the individual differences among personality characteristics of each athlete. It is acknowledged, however, that because absolute measures of anxiety levels were not assessed, no inferences can be made regarding the severity of the anxiety or its potential debilitating effects upon performance.

Retest reliability. Finally, to determine the relative stability of the paired similarity responses, weighted Kappa (Cohen, 1968) was calculated for each athlete retested. Weighted Kappa permits the researcher to differentially weight the magnitude of the differences in athlete responses between testing sessions. In this manner, the degree of acceptable variability and the relative stability of responses was established.

Results and Discussion

Group Space Dimensions

The similarity ratings of the athletes were analyzed using INDSCAL (Carroll & Chang, 1970). The program uses an iterative procedure, based upon regression techniques, which produces an n-dimensional solution that accounts for the greatest amount of explained variance among the stimuli. Each solution is accompanied by two goodness-of-fit indicators: a stress value (stress values range from 0-1, with zero indicating a perfect fit), and an R^2 value. The R^2 value represents the amount of variance that has been explained by the model and is considered to be the best indicator of how well the data fits the solution (Schiffman, Reynolds, & Young, 1981).

The rationale underlying the selection of the most appropriate dimensionality to represent the data is based primarily upon the interpretability of the model. However, the goodness of fit indicators are also considered. A higher dimensional solution is preferred to a lower dimensional solution only if the additional dimensions provide a greater understanding of the data (Davison, 1983). The stress and R^2 values for the two and three dimensional hockey and soccer group space solutions are displayed in Table 3.

Due to the absence of significance tests for stress and R^2 values obtained for Multidimensional Scaling (MDS) solutions, an alternative procedure was employed. In an effort to assess the likelihood that the hockey and soccer solutions were not obtained simply due to chance, stress and R^2 values for 23 random-number hockey matrices and 15 random-number soccer matrices were calculated (see Table 3). The stress values for the 'random solutions' are relatively close to the values obtained with the original data, which indicates that the random stimuli fit the solution as well as the original data. In contrast (and of greater importance to the researcher), the R^2 values from the random-number solutions were much lower than those obtained with the original data. This suggests that the variance accounted for in the 'real data' solutions could not have been the result of chance. The magnitude of the differences in the R^2 values between the original solutions and the random-number solutions provide some evidence that the original hockey and soccer solutions are statistically significant in that they are not reflective of randomly generated models.

Table 3

R^2 and Stress Values for INDSCAL Solutions

Solution	R^2	Stress
Hockey		
Two-dimensional solution	.34	0.34
Three-dimensional solution	.34	0.26
Random two-dimensional solution	.02	0.43
Random three-dimensional solution	.02	0.38
Soccer		
Two-dimensional solution	.40	0.35
Three-dimensional solution	.42	0.26
Random two-dimensional solution	.03	0.42
Random three-dimensional solution	.03	0.30

Three-dimensional solutions were chosen to represent both hockey and soccer group spaces. The three dimension solutions were preferred over both two and four dimensional solutions as they provided the most meaningful and viable interpretations of the data. The three-dimensional configurations for hockey and soccer are shown in Figures 3 and 4.

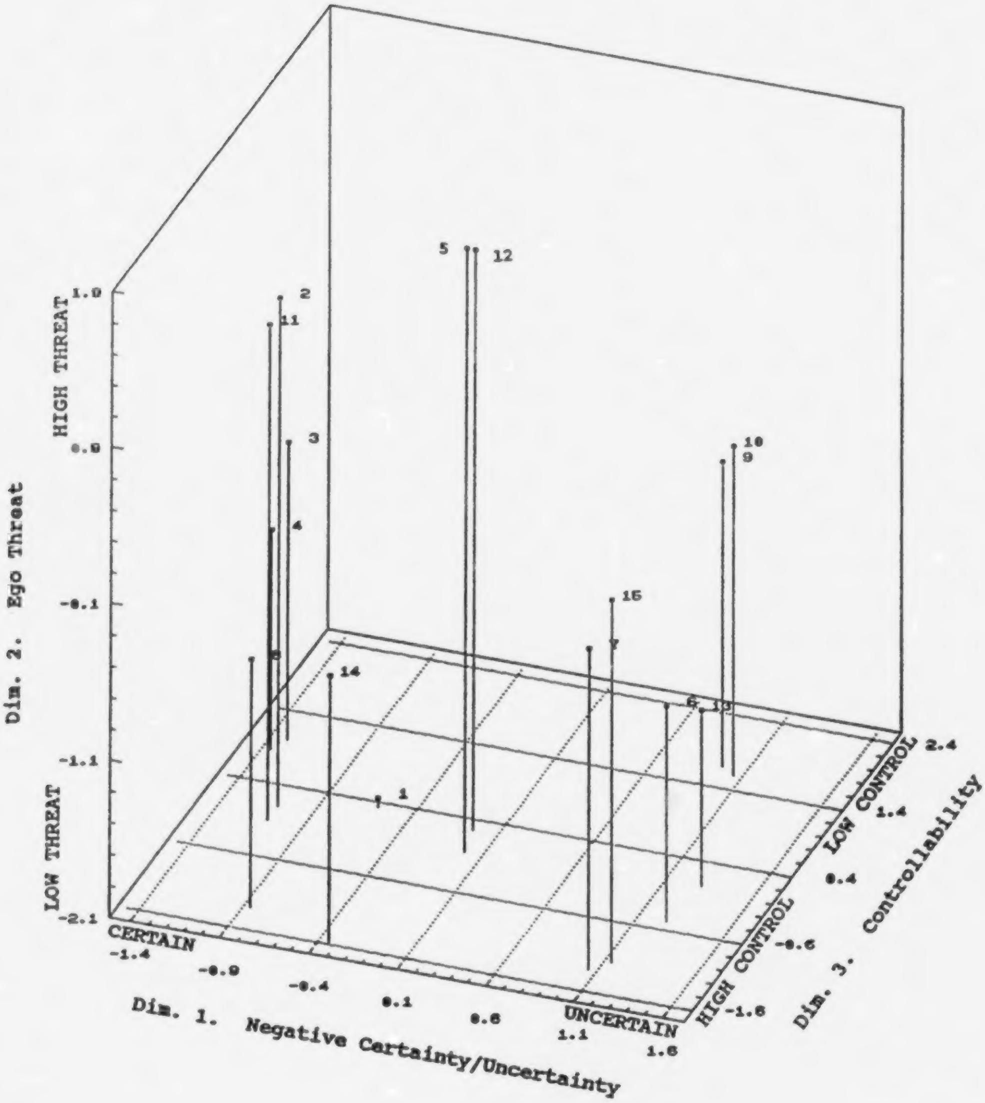

Figure 3 Three dimensional solution for hockey team.

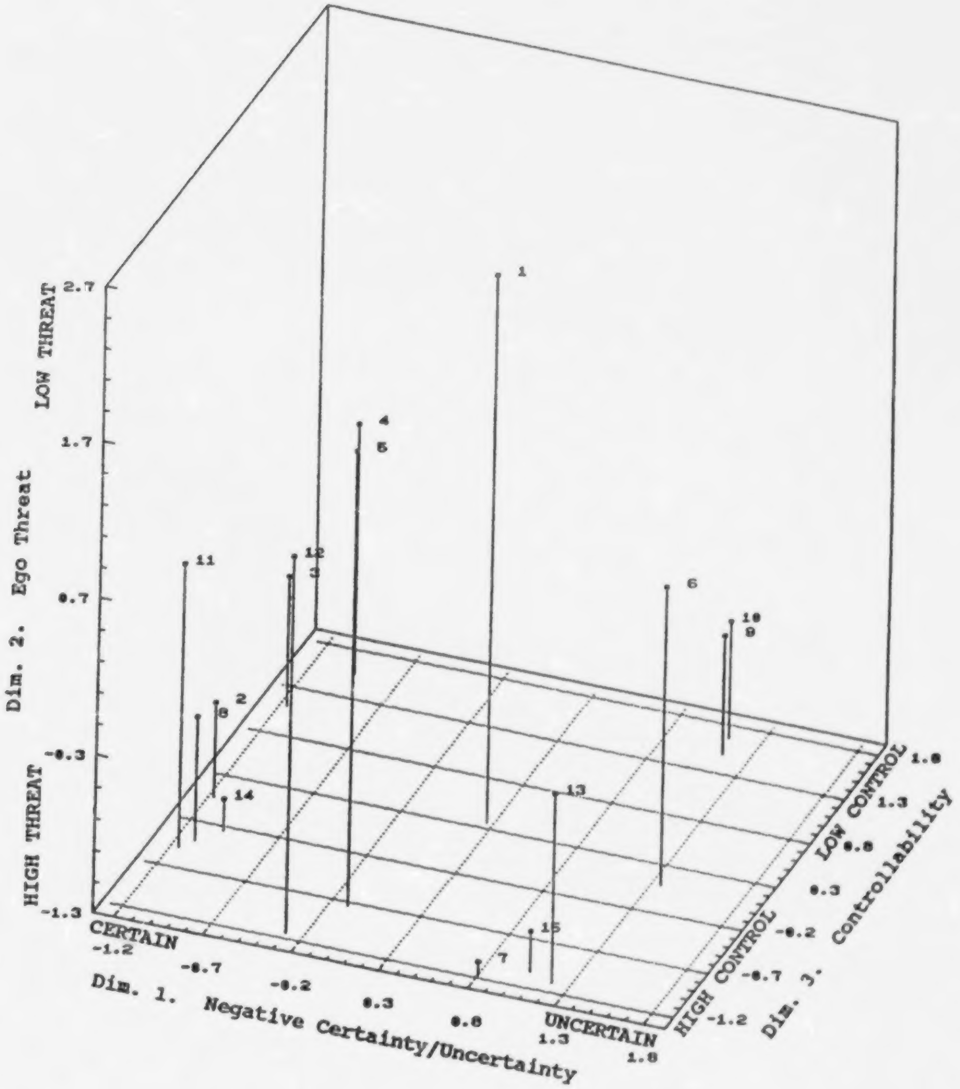

Figure 4 Three dimensional solution for soccer team.

Table 4

Hockey Stimuli Descriptions

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1. The referee makes an error on the call and you are given a two minute minor penalty for an infringement which you did not commit.
2. You commit an undisciplined penalty and during the resulting powerplay the opposition scores to take the lead.
3. After committing several unforced errors the coach benches you for the rest of the game.
4. The coach openly criticises you in full view of both team mates and spectators.
5. During an overtime period you are caught up the ice and see an opponent get a breakaway with only the goaltender to beat.
6. Late in a tied game the coach requests that you take a face off in your defensive zone.
7. You are pulled down on a breakaway and awarded a penalty shot which you feel you must score to win the game.
8. You miss a penalty shot at a crucial stage in the game.
9. You are chasing the puck into the corner with your back to the play. You are aware that an opponent is rapidly closing down but you cannot avoid the check.
10. An opponent winds up for a slap shot and in order to prevent the puck from hitting your net you must go down and block the puck with your body.
11. While attempting to break out of your own end you carelessly give away possession inside the blue line resulting in a goal for the opposition.
12. While in your defensive end you lose the opponent you were checking and realise that if he were to receive a pass an excellent scoring opportunity would be presented.
13. You are required to kill the last minute of a minor penalty late in the game.
14. An excellent scoring opportunity arises and you find yourself alone in the slot with only the goaltender to beat. However, you bury the puck into the goaltender's pads allowing an easy save.
15. Late in a tied game you get a breakaway and have only the opposition's goaltender to beat.

Table 5

Soccer Stimuli Descriptions

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1. The referee makes an error on the call and the opposition receives a direct free kick on the edge of the penalty box for an infringement which you did not commit.
2. You commit an undisciplined foul and from the resulting free kick the opposition scores to take the lead.
3. After committing several unforced errors the coach substitutes you out of the game.
4. The coach openly criticises you in full view of both team mates and spectators.
5. Late in injury time you are caught up-field and see an opponent get a breakaway with only the goalkeeper to beat.
6. Late in a tied game you are required to defend against a specific opponent at a corner kick.
7. You have been assigned to take a penalty kick which you feel you must score to win the game.
8. You miss a penalty kick at a crucial stage in the game.
9. You are in the opposition's penalty box and must attempt to challenge for a cross in the air, knowing that the opposition's goalkeeper is aggressively attacking the ball.
10. You are going towards the ball to receive a pass but are aware that an opponent is coming in hard from behind.
11. While attempting to make a pass back to the goalkeeper you carelessly give away possession to an opposing forward which results in a goal.
12. While defending you lose the opponent you were marking, and realise that if he were to receive a pass an excellent scoring opportunity would be presented.
13. You are the last defender and find yourself one on one with an opponent in your penalty box.
14. An excellent scoring opportunity arises and you find yourself alone in the penalty box with only the goalkeeper to beat. However, you shoot directly at the goalkeeper allowing an easy save.
15. Late in a tied game you get a breakaway and have only the opposition's goalkeeper to beat.

Each point (represented by a small box) in figures 3 and 4 corresponds to the location of each stimulus (i.e., situation) within the three-dimensional space. The numbers which identify each point correspond to the numbered situations listed in Table 4 for hockey and Table 5 for soccer. A vertical line is drawn from each stimulus point to provide its reference point on the bottom plane bounded by the horizontal and inset axes. The axis coordinates (dimension weights) of each point are contained within Table 6 for hockey and Table 7 for soccer.

Table 6

Stimulus Coordinates for Three Dimensional Hockey Solution

Stimulus Number	Abbreviated Stimulus Description	Dimension 1	Dimension 2	Dimension 3
1	Referee Error	-0.6337	-2.0473	0.3310
2	Bad Penalty	-1.1063	1.1585	0.1041
3	Substituted	-1.3149	-0.2113	1.0097
4	Coach Crit.	-1.3502	-0.7000	0.8482
5	Up-Ice	-0.0070	1.7693	-0.0604
6	Face Off	1.2639	-0.7344	-0.4846
7	Penalty Shot	1.0544	-0.0695	-1.3121
8	Missed Penalty	-0.8640	-0.5295	-1.2845
9	Chase puck	0.9603	-0.1619	1.7194
10	Block Slapshot	1.0508	-0.0002	1.6340
11	Bad Pass	-1.1067	1.0767	-0.1022
12	Lost Marker	-0.0466	1.6193	-0.2585
13	Penalty Kill	1.2991	-0.9815	0.0727
14	Easy Save	-0.3430	-0.4009	-1.5730
15	Breakaway	1.1438	0.2126	-1.1608

Note. Dimension 1 represents Negative Certainty/ Uncertainty, dimension 2 represents Ego Threat, dimension 3 represents Controllability.

Table 7

Stimulus Coordinates for Three Dimensional Soccer Solution

Stimulus Number	Abbreviated Stimulus Description	Dimension 1	Dimension 2	Dimension 3
1	Referee Error	0.2618	2.2085	0.3598
2	Bad Foul	-1.1720	-0.7278	0.0601
3	Substituted	-1.1672	-0.4792	1.0983
4	Coach Crit.	-0.9554	0.3007	1.5504
5	Up-Field	-0.0910	1.6116	-0.7433
6	Defend Corner	1.3519	0.5984	0.0977
7	Penalty Kick	0.8027	-1.2299	-1.1678
8	Missed Penalty	-1.1476	-0.5260	-0.3998
9	Chal. G'keeper	1.1417	-0.5490	1.5496
10	Await Tackle	1.1237	-0.5594	1.6721
11	Bad Passback	-1.1524	0.5016	-0.5274
12	Lost Marker	-0.2848	1.1277	-1.1483
13	Last Defender	1.2024	-0.0965	-1.1187
14	Easy Save	-0.9720	-1.1329	-0.2521
15	Breakaway	1.0477	-1.0477	-1.0307

Note. Dimension 1 represents Negative Certainty/ Uncertainty, dimension 2 represents Ego Threat, dimension 3 represents Controllability.

Discussion of dimension interpretations focuses predominantly upon situations with *absolute* dimension weights of ±.8 or greater. The rationale for this is that the interpretation of the dimensions was based primarily on the characteristics of the situations located at the extreme ends of each dimension: a situation with a small dimension weight tends not to be associated with that dimension. It is also acknowledged, however, that the solutions for both sports, as demonstrated by the moderate R^2 values, also contain moderate amounts of unexplained variance. This may also contribute to the seemingly inexplicable dimension weights of some stimuli.

Dimension I. The first dimension about which the stimuli from both sports were distributed was labelled Negative Certainty/Uncertainty. A situation (Sn) in which the athletes' actions had yet to take place, and where the potential for failure still existed (negative outcome uncertainty) received positive weights (e.g, Sn 6: face off/defend corner; Sn 13: penalty killing/last defender). Situations in which athletes had already experienced the negative consequence of failure (e.g., Sn 2: undisciplined rule infraction; Sn 11: bad pass gives away goal) received negative weights. Dimension I accounted for 55% of the total variance explained in hockey (35%), and for 61% of the total variance explained in soccer (42%).

Situations 5 (caught up-ice/up-field) and 12 (lost marker) were assigned extremely low certainty/uncertainty dimension weights in the solutions of both sports. Although athletes recognized that they were possibly at fault for allowing the situations to occur, the final consequence of their actions had still to be determined. That is, the situations contained athlete errors, but the final outcome was as yet undecided. Both situations, therefore, received relatively low dimension weights.

The characteristics of Dimension I are the same as the "outcome certainty" and "outcome uncertainty" factors extracted by Fisher and Zwart (1982) in their analysis of situational characteristics of anxiety inducing situations in basketball. This may therefore suggest that the certainty/uncertainty characteristics of parallel specific situations appear to be common across a variety of team sports.

Dimension II. The second dimension (vertical axes) extracted for both sports was labelled Ego Threat, and accounted for 7.8% of the total variance explained for hockey, and 8.4% of the variance explained for soccer. This dimension indicates the degree to which the "negative spotlight" (Fisher et al., 1982, p.145) focuses on the athletes in each situation. Situations in which an athlete would receive most, or all, of the blame for any negative outcome were labelled as high personal threat situations. Situations in which individual athletes would not be so clearly responsible for failure were labelled low personal threat situations.

High personal threat situations in hockey received high positive weights. For example, most hockey players consider failure in situations 2 (take bad penalty, opposition scores) and 11 (bad pass leads to opposition goal) to reflect very poorly upon their playing ability. Not only are the athletes largely responsible for the negative consequence in these situations but, in addition, everyone in the environment is aware of who committed the error.

High negative weights represented low personal threat situations. Understandably, situation 1 (referee error) would not be ego threatening to most athletes because they have not committed a mistake. It may also be argued that situation 13 (penalty killing) would pose little personal threat for many hockey players. To a certain degree elite level hockey teams expect to 'kill off' penalties. Nonetheless, the team in possession of the player advantage (i.e. on the powerplay) is still considered to have an excellent scoring opportunity. If the athletes killing a penalty were to concede a goal, little personal threat would be experienced because the likelihood of conceding a goal is still considered relatively high due to the discrepancy in the number of players on the ice.

The weights for the second dimension were reversed for the soccer solution; high positive weights represented low personal threat situations (e.g., Sn 1, referee error; Sn 5, caught up-field) and high negative weights represented high personal threat situations (e.g., Sn 7, taking penalty kick;

Sn 15, offensive breakaway). Although the physical characteristics of situations 7 (taking penalty shot/kick) and 15 (offensive breakaway) appear to be almost identical in both hockey and soccer, they are weighted quite differently on the ego threat dimension by the athletes in the two sports. This may be explained upon consideration of the frequency with which each of these situations are likely to be occur in the respective sports. Good scoring opportunities, such as those described in situations 7 and 15, are presented relatively infrequently at high levels of competitive soccer. As a result, the importance placed upon the need to score in those situations is extremely high; soccer players are likely to experience high levels of personal threat because they realize that additional good scoring opportunities may not be presented again during the remainder of the match. In other words, the athletes are aware that the consequence of failing to score could be very severe.

In contrast to soccer, hockey situations 7 and 15 had extremely small weights on the ego threat dimension. In spite of the high importance placed upon the conversion of good scoring opportunities in hockey, a key difference between hockey and soccer lies in the *number* of scoring opportunities presented in each. In hockey, 30 shots on goal and 6 goals by one team in a single game is not uncommon. On the other hand, 10 shots on goal with perhaps 3 goals by one team in soccer would be considered an excellent offensive performance. Therefore, the reason why situations describing good scoring opportunities in hockey received low ego threat dimension weights could have been a function of athletes' perceptions that other scoring opportunities would likely be presented. That is, failure to convert a single scoring opportunity in hockey may only produce moderate perceptions of personal ego threat.

The low ego threat dimension weights of situations 7 and 15 may have also been caused by the athletes' expectations for success in such situations. Because the percentage of successfully converted penalty shots and breakaways in hockey is considerably lower than in soccer, the expectations of hockey players to score in those situations may be lower than those of soccer players. Failure, therefore, may not constitute high 'ego threat' perceptions for many hockey players.

Other differences noted in the perception of ego threat in situations encountered by hockey and soccer players can be seen in the locations of situations 5 (caught up-ice/up-field) and 12 (lost marker). At first glance, these two situations appear to consist of almost identical observable game characteristics for both hockey and soccer. Nevertheless, these stimuli were heavily weighted as high personal threat situations by hockey players, but as low personal threat situations by soccer players. However, the difference in the way these situations were perceived may be a direct function of team size.

Social psychologists have determined that the amount of personal effort which individuals exert in specific situations is dependent upon the size of the group (Dashiell, 1935). Consequently, group size influences the degree to which group members will assume personal responsibility (Barker, 1960) and personal accountability (Weldon & Gargano, 1988) for their actions. Furthermore, Mann (1990) has demonstrated that the extent to which individuals accept personal blame is related to the "distinctiveness" (p. 456) of the individual within the situation. 'Distinctiveness' in the present context may be considered as the degree to which an individual can be singled out to accept the responsibility for failure. Latané and Darley (1970) proposed the term, "diffusion of responsibility" (p. 90-91) to describe this phenomena.

Mann (1990) demonstrated a tendency for individuals to blame others for failure if the group in which an individual is a member comes under attack (e.g., criticized for performance). In contrast, personal blame was accepted when the individual was alone in the situation. Weldon and Gargano (1988) also showed that individuals within groups performing complex cognitive tasks, when told that they would have to justify their decisions to an interview panel, expended greater amounts of cognitive effort than subjects who were not informed of the interviews. They concluded that subjects informed of the interview had assumed greater personal accountability for their actions.

In a study relevant to the physical activity setting, Ringelmann (Kravitz & Martin, 1986) observed that groups of individuals pulling together on a rope exerted less total force (as measured by a strain gauge) than the sum of the forces achieved by each individual when pulling on the rope alone. Latané, Williams and Harkin (1979) also demonstrated that individual effort decreased as group size increased. Subjects wearing earphones and blindfolds were instructed to shout as loud as possible while performing as individuals or as part of various sized groups. Unknown to the subjects of the study, on each occasion they actually performed on their own. The results showed that as pseudo-group size increased, the noise created by individuals decreased.

The findings of these studies indicate that as group size increases, the amount of individual responsibility, accountability, distinctiveness, and effort decreases. Therefore, in applying this phenomenon to hockey, if the opposition scores because a player was caught out of position, the blame could only be divided among a maximum of five skaters (excluding the goaltender). Hockey players may have a limited opportunity to diffuse responsibility within the situation and, therefore, appear to consider the situation to be ego threatening. In contrast, the responsibility for a similar situation in soccer can lay among ten players (excluding the goalkeeper). Thus, soccer players are less distinctive than hockey players and, as a result, may experience relatively less ego threat when committing an apparently parallel error.

Dimension III. The third dimension represented a continuum of Controllability. That is, situations were arranged along the dimension according to the degree of control which athletes possessed in each situation. Dimension III accounted for 7.5% of the total variance explained in hockey, and for 7.8% of variance explained in soccer.

Situations in which athletes assumed a relatively high degree of internal control or added personal responsibility received high negative weights. It appears that hockey players assumed personal control or responsibility for situations 7 (taking penalty shot) 8 (missed penalty shot) 14 (allow easy save) and 15 (offensive breakaway). A surprising and somewhat perplexing finding was that situation 11 (bad pass leads to opponent goal) was not more heavily weighted upon this dimension.

In soccer, it appears that athletes assumed a fairly high level of personal control or responsibility in situations 7 (take penalty kick), 12 (lost marker), 13 (last defender), and 15 (offensive breakaway). Situations 8 (missed penalty kick), 11 (bad pass gives up goal), and 14 (allow easy save) also received negative weights, which indicated that soccer players also viewed these situations as being internally controllable.

In both the hockey and soccer solutions, high positive weights were assigned to situations that could not have been directly controlled by the athlete (external control). These situations included Sn 3 (benched by coach), Sn 4 (receive coach criticism), Sn 9 (chase puck to corner while pressured/challenge goalkeeper), and Sn 10 (blocking slap shot/awaiting tackle from behind). These results are not surprising as athletes clearly have no direct control over their coach's behaviour in the coach-related situations (Sn 3 and Sn 4). In addition, athletes in situations 9 and 10 (where the potential for injury clearly exists) have only limited control because the outcome greatly depends on the actions of the opponent.

The controllability dimension is similar to the controllability dimension found in Weiner's causal-attribution model (Weiner, 1979). In a study assessing how well Weiner's original model (Weiner, 1974) could be applied to sport, Roberts and Pascuzzi (1979) showed that coaching behaviours and officiating could be categorized as externally controlled "sport-relevant attributions" (p. 209). Likewise, Gould et al. (1983) also found that coach-related situations and officiating loaded highly on an external control factor in a study of elite junior wrestlers. These findings are in agreement with the dimension weights assigned to the coach and referee related situations in the present study.

Multidimensional threat perceptions. Following examination of the weights assigned to stimuli on the three dimensions discussed previously, an important finding was noted. Specifically, a number of situations were found to load highly on more than one dimension. For example, soccer situations 7 (take penalty shot/kick) and 15 (offensive breakaway) represented extreme values on the negative certainty/uncertainty and controllability dimensions. The implications for researchers attempting to understand the characteristics of anxiety inducing situations are of paramount importance. Situations which load highly upon two dimensions (or more) do not consist merely of a unidimensional threat, and this must be considered if researchers are to fully understand the anxiety process.

The multidimensional threat characteristics of a situation are clearly demonstrated by the dimension weights and cluster membership of situation 10 (awaiting tackle from behind) in soccer. Consider what might happen if soccer situation 10 was included in a stimulus-response (S-R) inventory of anxiousness (see Endler & Hunt, 1966), but the underlying threat characteristics of the stressor were not known or accounted for by the researcher. Situation 10 has three potential threats which athletes may perceive: the potential for a negative outcome (i.e. may lose possession of the ball); external control (i.e. whether the athlete is tackled depends upon the opponents decision), and fear of potential injury (a tackle from the rear in soccer often results in injury because the athlete is relatively defenceless). Suppose that two athletes completing the S-R inventory respond with identical levels of anxiety on situation 10. No definitive explanation could be proposed to account for the same response levels of both individuals, because the relative contribution that each of the three potential sources of threat could have made are unknown. As Spielberger (1972) argued, until a greater knowledge of stressor characteristics is attained, only a limited understanding of the State-Trait paradigm of anxiety can be accomplished. The discovery of multidimensional threat characteristics reinforces the need to more fully understand the complex nature of stressors.

Group Space Clusters

Further information pertaining to the "hidden structure" underlying the stimuli can be obtained from the interpretation of homogenous groupings into which certain data points cluster. The magnitude of the distances between stimuli points within clusters can differ greatly, yet no statistical rule-of-thumb exists upon which to base the inclusion of a stimulus within a cluster can be determined.

Establishing the cluster membership of a situation is, therefore, at the reasonable discretion of the researcher.

Cluster membership decisions in the present study were based upon the logical interpretability of the cluster which the stimuli formed, and upon the relative interpoint distances both within the cluster and between other clusters. Interpoint distances in the present study were estimated upon the visual proximity of points, however, mathematical calculations can be performed using a pythagorean formula to calculate the precise distances (see Kruskal & Wish, 1978, for complete discussion).

Fear of injury. In the solutions obtained for both hockey and soccer (see Figures 3 and 4), the clusters formed by situations 9 (chase puck to corner/challenge keeper) and 10 (block slap shot/awaiting tackle from behind) were labelled Fear of injury. Although the situations are different for the two sports, it appears that one central feature of all four situations is the potential that exists for injury. Fear of injury/fear of physical harm is not a new concept as it has been the focus of research in both social psychology (Endler & Okada, 1975; Folkins, 1970; Magnusson & Ekehammar, 1975; Patterson & Neufeld, 1987; Thompson, 1981) and sport psychology (Fenz, 1988; Powell & Verner, 1982).

Coach threat. Situations 3 (benched) and 4 (coach criticism) formed relatively tight clusters in the solutions for each sport. Careful consideration of the characteristics of these situations revealed two common themes. Both situations are outside the control of the athletes and both contain the coach as the central character. The clusters were named uncontrollable coach related threat.

Fear of failure. Although situations 6,7,13 and 15 in hockey and soccer are less tightly grouped than the stimuli within the injury and coach-related clusters, interpretable homogenous characteristics are still present. Namely, the outcome of each situation is unknown, and the potential for failure in each situation still exists. Based on these characteristics, the cluster contained situations where the fear of failure appeared to be the major threat. This cluster is in agreement with previous research in which the 'fear of failure' concept has been associated with anxiety (Gould, Horn, & Spreeman, 1983; Kroll, 1979; Martens et al., 1990; Passer, 1984).

Negative outcome certainty. Relatively dispersed clusters were formed in both the hockey and soccer solutions by situations 2,8,11 and 14. In these situations the athlete has failed to achieve the desired outcome and the responsibility for failure apparently lies mainly with the individual. The clusters were labelled negative consequence ego threat.

Helpless frustration. By definition, a single data point cannot be called a cluster. However, based on the relative isolation of situation 1 (referee error) from other points in both solutions, it may be suggested that this situation possesses characteristics that are not inherent in any of the other situations. When the referee makes a critical error, not only is the athlete entirely powerless to influence the referee's decision, but no infraction of the rules has actually been committed. Therefore, anxiety is likely experienced as a result of frustrated helplessness.

The final clusters formed in both solutions comprised of situations 5 (caught up-ice/field) and 12 (lost marker).

The main characteristic which separated these situations from the other stimuli was the unknown consequence of the mistake. That is, although an error had been committed by the athlete, the outcome had still to be determined.

Model Weaknesses

It would be misleading to suggest that the configurations obtained for the two sports provided clear, accurate and error free representations of situational threat perceptions. Indeed the dimension weights of certain situations appear to undermine some of the arguments upon which dimension interpretations were established (e.g., hockey situation 11 on Dimension III). Nonetheless, the solutions and the methodology employed provide strong starting points upon which situational characteristics can begin to be understood.

As noted earlier, the configurations display the location of stimuli based upon the group average. Realistically, this representation may not accurately reflect the characteristics of *any* one individual. In actuality, athletes are very unlikely to perceive situations in identical ways to one another, therefore, individual analyses must be conducted to determine where these differences exist. In the words of Silva (1984) "when psychological measures are averaged across individuals, a mean or average personality is often reported. Yet this profile may not represent any athlete in the sample because the mean is often affected by extreme scores" (p. 65).

Individual Differences

Perceptual configurations.

The discussion of individual differences will predominantly focus upon the differences between stimuli locations on athlete configurations, as opposed to dimensional interpretations. To obtain individual configurations, the similarity ratings of each athlete were analyzed using ALSCAL (Takane, Young, & de Leeuw, 1977). The purpose of ALSCAL is similar to that of INDSCAL described previously, however, ALSCAL produces a solution which was derived from only *one* data matrix. This matrix normally contains proximity data based upon the whole group and, although not considered to be a common procedure, the use of a matrix based upon the proximity measures of one individual is still considered a legitimate practice (T.O. Maguire, personal communication, December 19, 1991). Two individual hockey and two individual soccer solutions were chosen to highlight individual differences. The stress and R^2 values of the four solutions are shown in Table 8.

Table 8

R^2 and Stress Values for Individual ALSCAL Solutions

Solution	R^2	Stress
Hockey		
Player 12 Three-dimensional solution	.84	.159
Player 20 Three-dimensional solution	.81	.146
Soccer		
Player 2 Two-dimensional solution	.93	.112
Player 6 Three-dimensional solution	.87	.142

Hockey; Individual differences. The two hockey players chosen were selected because both had similar stress and R^2 values for the three dimensional solutions. In addition, both athletes played the same position (i.e. centre), enabling any effects which position may have had upon perceptions to be controlled to a certain extent. The three dimensional solutions of player 12 and player 20 are shown in Figures 5 and 6.

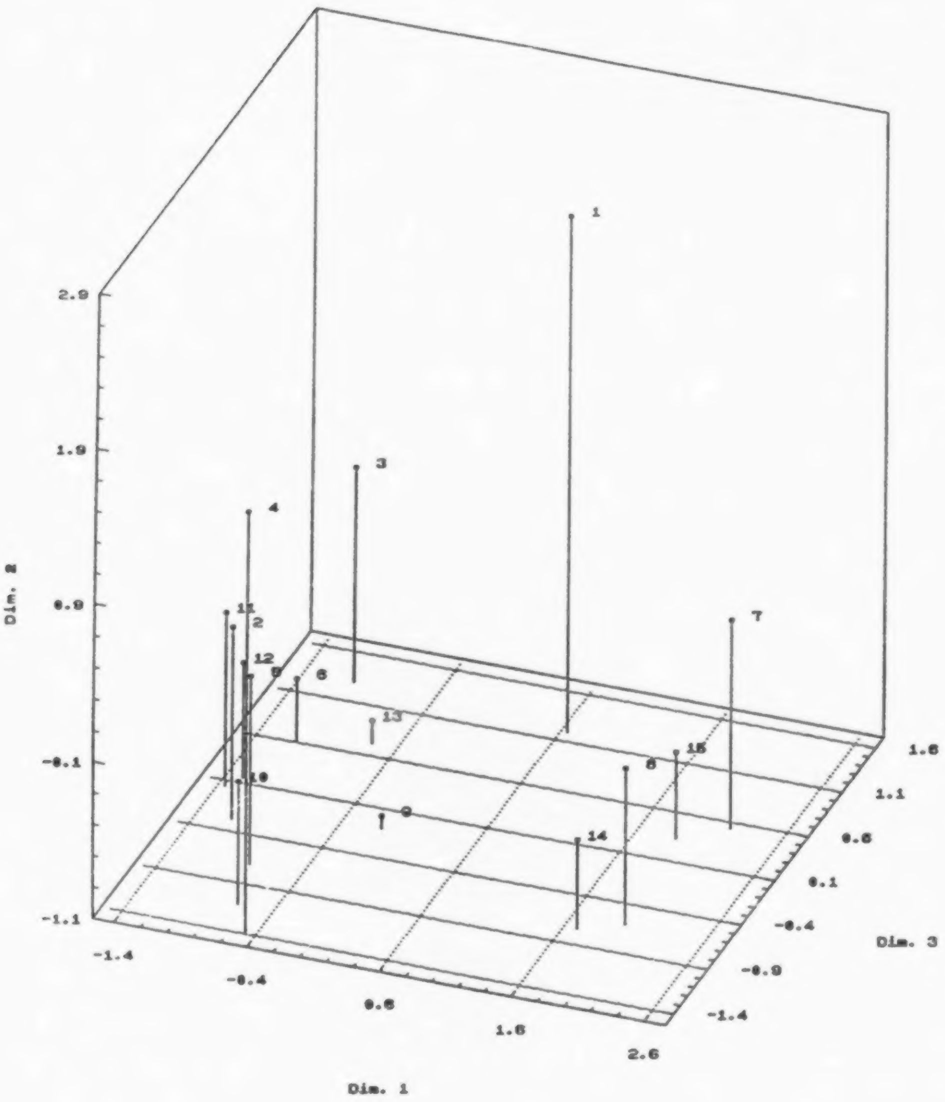

Figure 5 Individual hockey solution for player 12.

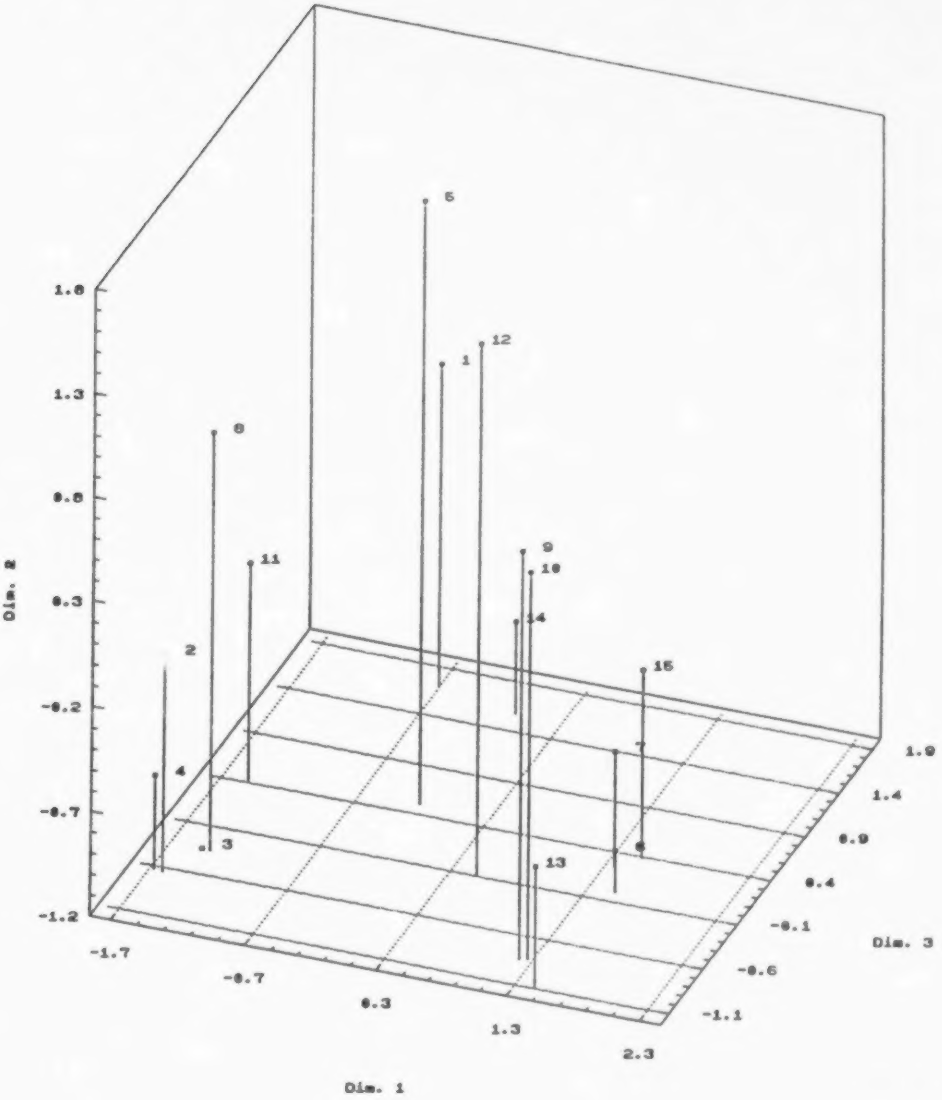

Figure 6 Individual hockey solution for player 20.

Player 20 appears to have viewed some of the situations in accordance with the constructs identified in the group analysis. That is, player 20 formed clusters based upon the 'negative outcome certainty' (situations 2,3,4,8, and 11) and 'negative outcome uncertainty' constructs (situations 6,7,9,10,13, and 15). In contrast, player 12 appears to have based similarity ratings primarily upon the offensive and defensive characteristics of the situations. Situations 2,5,6,10,11,12, and 13 formed a cluster which contained only defensive situations, whereas situations 7,8,14, and 15 formed a cluster which contained only offensive situations.

Large perceptual differences between the two players can also be seen in the locations of the coach-related situations (3 and 4). Player 20, again in accordance with the group-space configuration, perceived the coach-related situations to be very similar. In contrast, the large distance between the location of situations 3 and 4 indicates that player 12 perceived few similarities.

One final indication of athlete differences is also of note. Specifically, player 20 not only considered situations 9 (chase puck) and 10 (block slap shot) to be very similar, but both situations formed a cluster in relative isolation to any other situations. It may be inferred from these findings that player 20 particularly identifies the 'injury' characteristics of both situations. Player 12, on the other hand, does not appear to have based his perception of the similarity of the two situations primarily on the threat of injury. This is evident in the absolute distances (calculated with the pythagorean formula in Kruskal & Wish, 1978) between the placement of situation 9 and situations 6, 13 and 10 are examined. Situation 9 (chase puck into corner while pressured), based upon Euclidean distances, is .96 units from situation 13 (penalty killing), 1.27 units from situation 6 (about to take defensive face off), and 1.33 units from situation 10 (block slapshot). It may be argued that the threat perceptions of player 20 in situation 9, are based primarily upon 'defensive outcome uncertainty' (i.e. the characteristics of Sn 6 and 13) as opposed to the 'fear of injury'.

Soccer; Individual differences. The solutions of the two athletes which received the highest R^2 values were chosen to represent the soccer sample. A two dimensional solution was chosen to represent player 2 because the addition of a third dimension did not add to the interpretability of the solution or to the stress and R^2 values. The configurations for players 2 and 6 are displayed in figures 7 and 8.

The solution obtained for player 2 portrays a very dichotomous and perhaps simplistic perceptual structure upon which threat perceptions were based. Dimension I clearly separates the situations according to the negative outcome certainty/uncertainty characteristics. Negative dimension weights represented the negative outcome certainty situations (i.e., situations 3,4,5,8,11,12, and 14), while positive weights represented negative outcome uncertainty situations (i.e., situations 6,7,9,10,13, and 15). Only situation 1 (referee error) received a high loading on Dimension II, which probably indicates the 'helpless frustration' characteristics previously described.

The solution obtained for player 6 depicts a considerably more complex perceptual structure than that obtained for player 2. Three main clusters can be observed within the configuration of player 6: negative consequence/ego threat (situations 2,3,8,11,12, and 14); fear of failure (situations 6,7,13, and 15), and, fear of injury (situations 9 and 10).

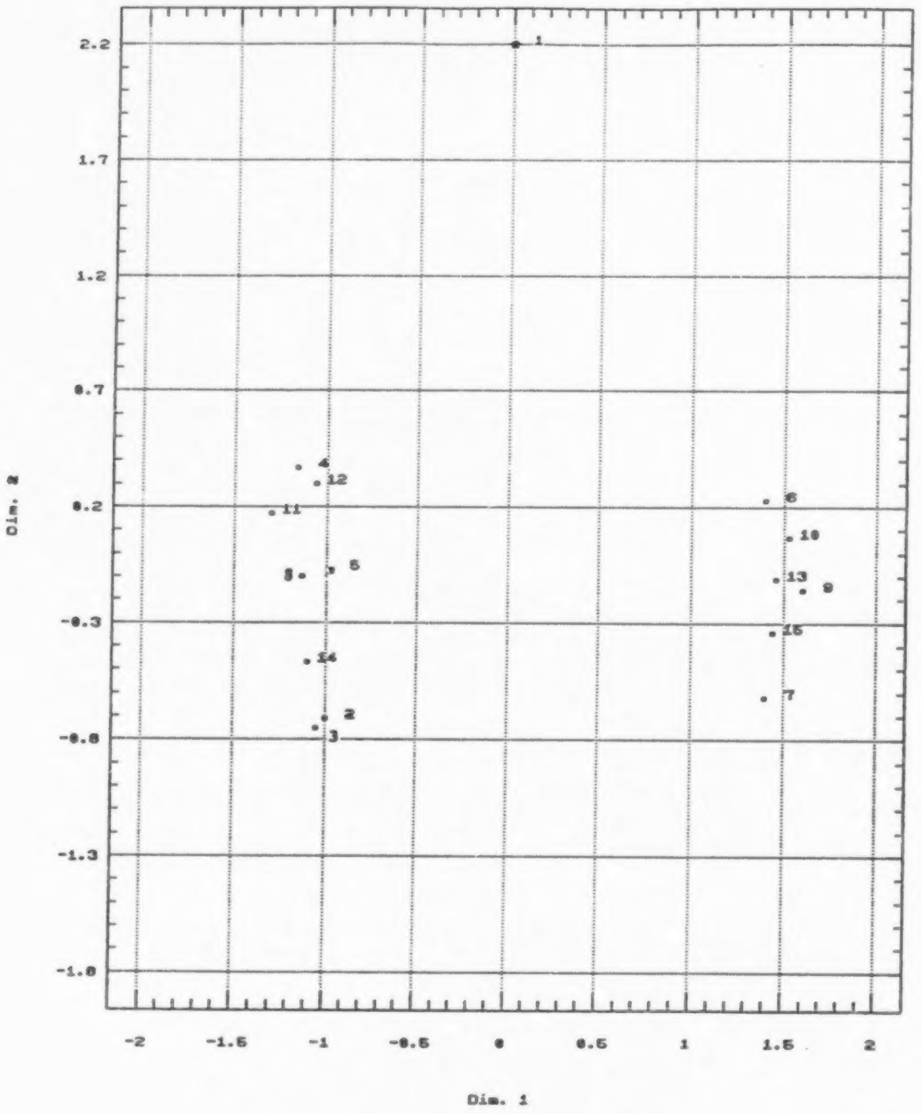

Figure 7 Individual soccer solution for player 2.

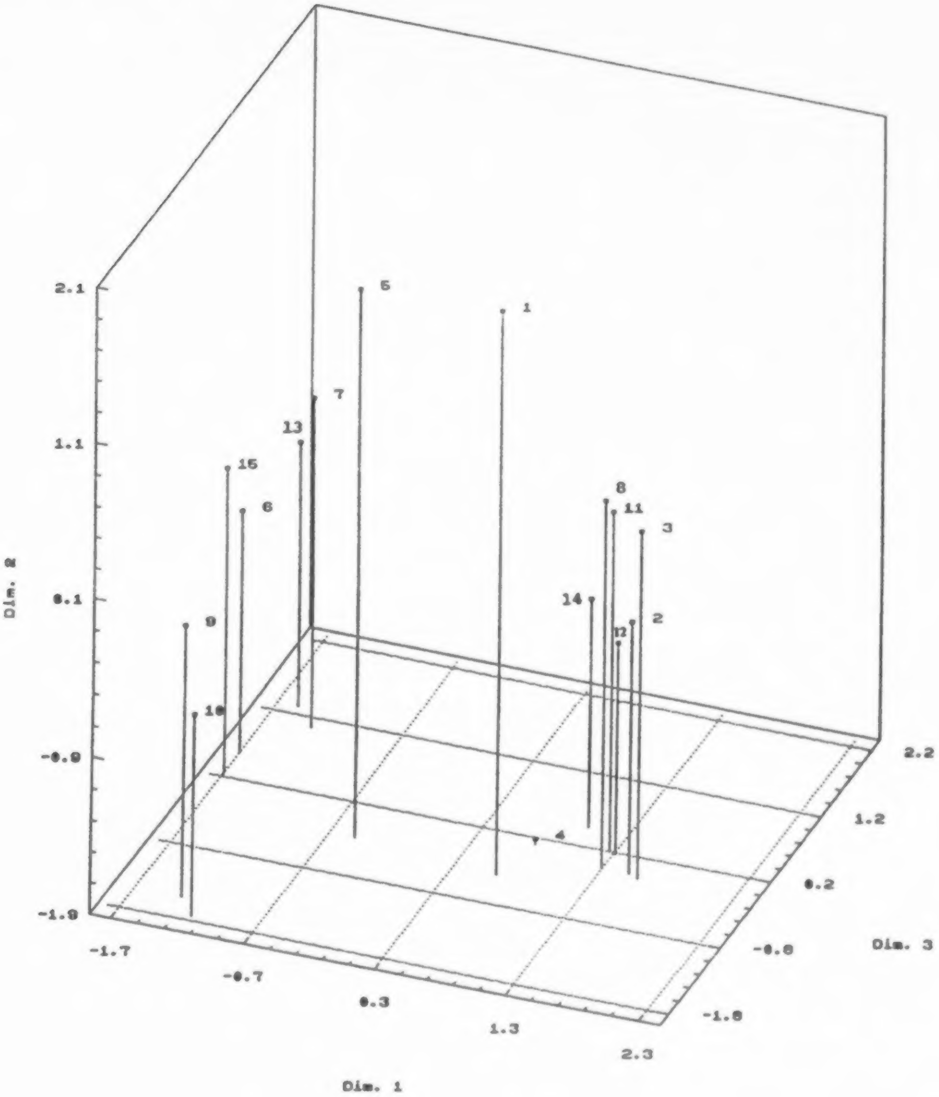

Figure 8 Individual soccer solution for player 6.

In addition to the three main clusters obtained for player 6, a more disperse cluster was also formed by situations 1 (referee error) and 5 (caught up-field). The predominant features appear to be a combination of 'helpless frustration' and limited 'ego threat'. However, the interpretation given to the fourth cluster becomes clearer when the athlete's playing position is considered.

Player 6 is a striker (offensive position). The majority of a striker's playing duties take place in the opposition's half of the field. As a result, this player would seldom, if ever, be blamed for being 'caught up-field'. Therefore, it can be suggested that the athlete would experience a sense of 'helpless frustration' in both situations 1 and 5 as a result of being unable to influence either the referee's decision or the opponents scoring opportunity. Little 'ego threat' would be experienced in both situations because the athlete, in all probability, would not be blamed for any resulting negative consequences.

In contrast to player 6 above, player 2 is a defender. Thus, player 2 would probably experience a considerable amount of ego threat in situation 5, because a defender's primary playing role is to prevent the opposition from scoring. To be 'caught up-field' would be considered one of the most severe mistakes a defender could make. Situation 5 is located very close to all of the other negative consequence/ego threatening situations as shown in Figure 7.

The discussion of the differences in athlete perceptual configurations was included to emphasise the need to examine individual differences in sport psychology research. Specifically, different perceptual structures highlight many important differences in the ways certain situations can be perceived by different athletes. Had the discussion been limited to the group-space configurations, many of the important perceptual differences between individual athletes would have been overlooked.

Situation-rank analysis. Table 9 displays the number and percentage of hockey and soccer players who ranked situations in the top five 'most anxiety inducing' category (rank 1-5), and the bottom five 'least anxiety inducing' category (rank 11-15). The table also displays the mean rank of each situation, and the overall rank of each situation based upon the value of the mean ranks. It can be seen that, as a group, hockey players ranked situation 11 (bad pass gives up goal) as the most anxiety inducing, and situation 10 (blocking slap shots) as the least anxiety inducing. The soccer team ranked situation 11 (bad pass gives up goal) and situation 8 (missed penalty) as the most anxiety inducing. Situation 10 (waiting to be tackled from behind) was ranked as producing the least anxiety.

Wilcoxon matched-pairs signed-ranks tests were used to determine the statistical significance of the differences in the values of the ranks assigned to each situation by the players within each sport. That is, the test was used to determine if the athletes, as a team, tended to rate certain situations as more anxiety inducing than others. Each of the five most anxiety inducing hockey situations (11,2,7,8,5) was ranked significantly different from each of the five least anxiety inducing situations (10,1,9,13,6). The difference between each pair of situations was significant at the $p<.01$ level with the exception of situation comparisons 6 v 8 and 6 v 5 (which were significant at $p<.05$ level).

The soccer analysis provided similar results to those obtained for hockey. Each of the five most anxiety inducing soccer situations (11,8,2,7,15) was significantly different from each of the five least anxiety inducing situations (10,9,6,1,3). The differences between each pair of situations was significant at the $p<.01$ level except situation comparisons 3 v 7 and 3 v 15 (significant at $p<.05$ level).

Table 9

Frequencies, Percentages and Means of Hockey and Soccer Team Anxiety-Severity Rankings of Each Situation

Abbreviated Situation Description	Rank 1-5[a]		Rank 11-15[b]		Mean Rank	Mean Rank Ranking[c]
	n	%	n	%		
Hockey						
1. Referee error	3	13	18	78	12.0	14
2. Undisciplined penalty	14	61	1	4	4.9	2
3. Benched by coach	5	22	11	48	8.9	10
4. Coach criticism	9	39	4	17	7.6	8
5. Caught up-ice	11	48	4	17	6.5	5
6. Defensive face-off	5	22	11	48	9.3	11
7. Take penalty shot	13	57	2	9	5.2	3
8. Missed penalty shot	9	39	2	9	6.0	4
9. Chase puck into corner	2	9	18	78	11.7	13
10. Block slap shot	1	4	20	87	12.9	15
11. Bad pass gives goal	19	83	0	0	3.4	1
12. Lost marker	7	30	2	9	6.7	6
13. Penalty killing	4	17	13	57	10.1	12
14. Allow easy save	5	22	8	35	8.5	9
15. Breakaway	8	35	4	17	6.9	7
Soccer						
1. Referee error	1	7	8	53	10.7	12
2. Undisciplined foul	12	80	1	7	4.3	3
3. Benched by coach	4	27	8	53	9.6	11
4. Coach criticism	4	27	6	40	8.8	10
5. Caught up-field	4	27	3	20	7.9	6
6. Mark at corner kick	1	7	11	73	11.3	13
7. Take penalty kick	9	60	2	13	5.2	4
8. Missed penalty kick	11	73	1	7	4.1	1
9. Challenge goalkeeper	1	7	11	73	11.3	13
10. Awaiting tackle	1	7	11	73	11.9	15
11. Bad pass	12	80	1	7	4.1	1
12. Lost marker	3	20	3	20	8.2	8
13. Last defender 1v1	4	27	6	40	8.5	9
14. Allow easy save	1	7	2	13	8.1	7
15. Offensive breakaway	7	47	1	7	6.0	5

Note. Ranking scale used by athletes: 1 (most anxiety) to 15 (least anxiety).

[a] Number(n) and percentage(%) of athletes who rank a situation from 1-5; [b] Number and percentage of athletes who rank a situation from 11-15; [c] Rank 1(most anxiety) to 15(least anxiety).

The ranking results for both sports show that certain situations are perceived by the two teams to be more anxiety inducing than others. The Wilcoxon significance levels appear to strengthen the suggestion that considerable similarity and agreement exists among the way that athletes from the same team perceive the severity of anxiety experienced across various situations. To a certain degree this is true, however, the argument in favour of examining individual differences is also supported by these findings.

Situation 10 (blocking slap shot) was ranked by the hockey players to be the least anxiety inducing situation of the 15 presented. Table 9 shows that 20 of the 23 athletes ranked this situation in the least anxiety inducing category (rank 11-15). Nonetheless, one athlete ranked this situation in the top five most anxiety inducing category (rank 1-5). If only the Wilcoxon statistics and the mean ranks for each situation had been considered, the athlete ranking the situation in the top five would have been overlooked and in fact, misrepresented. Such an omission could have serious practical implications for a coach. For instance, a coach may choose that player to kill a crucial penalty, where players are frequently expected to throw their body in front of the puck to prevent the opposition from scoring. The player's ranking, however, indicates that he is fearful in this situation and thus may fail to "go down and block the shot". A goal may be conceded which may have been avoided. In other words, it is vital that coaches consider all athletes as individuals, even if group statistics and convenience suggest otherwise.

The implications of a coach only considering group average data are also apparent in the soccer data. Situation 8 (player having missed a penalty kick) was ranked the most anxiety inducing situation by the team, with 11 of the 15 players ranking 'missing a penalty kick' as one of the five most anxiety inducing situations. However, one athlete ranked this situation in the bottom third. Coaches may be at an advantage if they are aware of players who are not adversely affected by this kind of failure. For example, such players may be excellent candidates to take penalty kicks in crucial game situations; failure to score by this athlete is unlikely to adversely affect later performance.

Although the discussion has focused upon the implications of individual differences among athletes' rankings, it is acknowledged that no measures of absolute anxiety were recorded in the present study. To suggest that one athlete experiences more or less anxiety in certain situations would be wrong. In other words, it is not known whether the athlete who assigns the rank of 1 to a certain situation actually experiences more or less anxiety than the another athlete who gives the same situation a rank of 15.

Effects of coach behaviours. Coaches in all sports must always consider how different athletes will respond to certain types of performance feedback and other coach-related behaviours. For instance, adverse performance effects have been associated with athletes who receive continual negative feedback (i.e. verbal punishment) from coaches (Kirschenbaum & Smith, 1983; Kirschenbaum, Wittrock, Smith, & Monson, 1984). In addition, coaching behaviours have also been shown to adversely affect both athlete self perceptions and athlete perceptions towards the coach (Horn, 1985; Smoll, Smith, Curtis, & Hunt, 1978). In view of these findings, coaches must be aware that certain of their behaviours can have detrimental effects upon athletes. Further evidence of this is shown in the sport psychology literature.

Horn (1984) demonstrated that within each team, the quality and quantity of coach-player interactions vary from player to player. As a result of these within-group differences, Horn (1985) emphasised that studies which examine the effects of coaching behaviours must focus upon the *individual* as opposed to the entire team. The extent to which individual differences are present with regards to athlete perceptions of coach criticism are clearly seen in the hockey rankings of situation 4 (see Table 9). Almost 40% (n=9) of all hockey players ranked 'receiving coach criticism' as one of the most anxiety inducing situations (rank 1-5). In contrast, another 20% (n=4) of athletes indicated that receiving coach criticism was among the least threatening situations (rank 11-15). In fact, one athlete indicated that receiving coach criticism was the most threatening of the 15 situations (rank 1), whereas another athlete ranked coach criticism as the least threatening situation (rank 15). Clearly, the coach must be aware that these two individuals need to be treated very differently when certain types of performance feedback are required.

Stability of Perceptions. A total of eight athletes (five hockey, three soccer) were randomly selected to be retested. Weighted Kappa coefficients obtained for the hockey players were .79, .74, .73, .69, and .48; the coefficients for the three soccer players were .54, .51, and .48 (See Appendix D for weight matrix). Bakeman and Gottman (1986) suggest that kappa values of .7 or greater indicate acceptable retest reliability. Based upon the number of athletes whose retest coefficients were below .7, it appears that the stability of some athletes' perceptions are questionable. However, a variety of threats to internal validity may have existed that partially explain the low retest coefficients.

Ray and Ravizza (1981) state that "internal validity asks the question: Is there another reason that might be used to explain the outcome of our experimental procedures?" (p. 36). In the present study, the timing of the testing sessions may have been a major factor which influenced internal validity. That is, the soccer players were initially tested during the final week of their regular season, whereas, the retesting took place two months after the end of the season. Soccer players' perceptions may have been seriously affected by the change in circumstances surrounding the testing dates. In contrast, the hockey players (whose coefficients appear to be more acceptable) were tested during the regular season on both occasions and, therefore, would have been less likely to be affected by such changes.

Another possible threat to internal validity that may have affected athlete responses, could have occured due to test environment differences. On the initial testing sessions athletes from both sports conducted the test in a group environment while receiving verbal instructions from the researcher. However, on the second testing session athletes completed the inventory in isolation and received no verbal instructions from the researcher.

Between-test differences in the manner by which athletes used the category rating scales could also have affected retest reliability. In other words, on the initial testing session, athletes may have been reluctant to use extreme values on the scale. However, on the second testing occasion (e.g., inventory familiarity), athletes may have been more inclined to use extreme scores (and vice-versa). Such changes would greatly influence Kappa coefficients.

Finally, athlete perceptions may have been affected by test-related communications among team mates. Such interactions could have provided athletes with perceptual information originally overlooked in the first session. Regardless of whether these threats to internal validity did affect the retest perceptions, more extensive examination of perception stability is required if the dimensions extracted in the present study are to be validated.

CHAPTER 4 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The purpose of Studies 1 and 2 was to identify the anxiety inducing game situations which athletes from a variety of team sports typically encounter during competition. In addition, the studies attempted to determine the extent to which the characteristics of these situations were similar across the sports. The classification system which was developed demonstrated that situations across the sports possessed very similar generic physical characteristics. In other words, many of the features of sport specific situations are not really unique to any one sport. The system provides researchers, sport psychologists, and coaches with a comprehensive list of potential competitive game situations within which athletes from a variety of team sports may experience anxiety.

Study 3 consisted of multiple purposes, however, the main objectives were to identify the cognitive dimensions upon which athlete threat perceptions were based, to examine within-sport and between-sport dimension similarities, and to compare the results obtained from individual athletes with the results obtained from group data averaging techniques.

The group space configurations obtained for both hockey and soccer provided evidence that athletes within the same team (and sport) base threat perceptions along similar cognitive dimensions. That is, athletes from the same sport, to a certain extent, recognise the same threatening features in specific game situations.

Many of the similarities between the hockey and soccer solutions showed that athletes from both sports did in fact base threat perceptions along the same cognitive dimensions (i.e., negative certainty/uncertainty, ego threat, controllability). Such findings are important for sport psychologists who often work with athletes from a variety of sports. If certain features of anxiety inducing situations can be generalised between sports, as the present research suggests, the task of acquiring knowledge in unfamiliar sport environments will be made easier.

Various stimuli within the group configurations received high weights on more than one dimension. These findings demonstrated the multidimensional nature of anxiety inducing stressor characteristics. Stated another way, in certain situations there can be one, two, or a combination of possible factors which can create anxiety. If researchers and sport psychologists are to fully understand why different athletes experience different anxiety levels in the same apparent situations, the situational threat characteristics most salient to each individual must be determined.

The group space configurations, however, also demonstrated that distinct between-sport differences existed in the way that certain evidently parallel sport situations were perceived. In other words, situations which appeared to have identical physical characteristics in both sports (e.g., caught up-ice/up-field) were perceived to pose different threats for hockey versus soccer athletes. These findings reinforce Endler's theory (Endler, 1981) which suggests that specific environments (e.g., type of sport, nature of the game) produce unique effects upon the individuals exposed to the specific characteristics within those surroundings.

The group configurations provided a valuable insight into the overall perceptual characteristics of the teams. However, the individual athlete configurations highlighted within-group differences which the group analyses failed to show. As previously discussed, the group space solutions are based upon the averaged data of all the athletes within each team. As a result, the group space solutions may not truly represent any one individual within a team.

One problem is inherent with statistical techniques which provide solutions based upon averaged data. Namely, average solutions can always be affected by extreme data points. Consequently, the individual solution obtained for player 20 (ice hockey) clearly did not fit the group configuration at all well, and probably increased the amount of error variance present within the group model. The nature of this athlete's threat perceptions would not have been disclosed had only group configurations been examined. This example reinforces the need to consider individual differences in sport psychology research.

The results obtained from the rank analyses also displayed considerable within-group agreement. The group analyses showed that athletes from the same team tended to similarly differentiate between the most and least severe anxiety inducing situations. These findings can help direct the attention of coaches and sport psychologists to the most frequent situations in which the majority of athletes experience considerable threat. In contrast to the group results, however, considerable variations were again observed at the individual level of analysis. Specifically, it was frequently observed that some situations which were ranked as producing the lowest levels of anxiety by a large number of athletes were simultaneously perceived by one or two athletes to be among the most severe anxiety producers. Clearly, when such large perceptual discrepancies between athletes exist, coaches and sport psychologists must treat athletes as individuals, and be wary of treating athletes as collective groups of similar individuals.

Recommendations

Based upon the findings obtained in the present study, the following recommendations for future research are presented:

1. A complete replication of the study would help determine the reliability of the dimensions and clusters obtained. The moderate weighted Kappa values obtained for the retested athletes suggest that perceptions may be relatively unstable.

2. If future studies utilise similar methodological procedures, it would be advisable to ask the athletes themselves to describe the reasons why anxiety is experienced. In this way, the validity of the dimension and cluster interpretations made by the researcher could be checked.

3. The role of variables such as age, gender, and sport-type should be examined to determine whether they differentially affect athlete threat perceptions towards specific competitive situations. Such research would help determine whether the cognitive dimensions obtained within the present study are influenced by these variables.

4. If researchers wish to gain a greater understanding of the State-Trait Anxiety paradigm in competitive sport, their methodologies must begin to account for the differential effects created by specific situational features. Therefore, instruments must be developed to help predict how athletes are likely to react in certain situations. The frequently used 'pre-game state/trait anxiety inventories' provide limited information as to how athletes will respond when confronted with the variety of specific stressors (i.e., game situations) during actual competition.

5. Another important variable which requires more attention than received in the present study, but which may strongly influence threat perceptions, is playing position.

Athletes playing in different positions are likely to perceive certain situations in different ways. For example, forwards in soccer, whose main role within the game is to score goals, may relish breakaway opportunities against opposing goalkeepers. In contrast, defenders, who are rarely, if ever, presented with such scoring opportunities may perceive the situation very differently.

6. Finally, research methodologies employed in sport psychology would be advised to consider the importance of examining individual differences among athletes in the future. As the present study highlighted, individual difference designs help alleviate the potentially misleading information which group results can provide.

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APPENDIX A

RESPONSE INVENTORY FOR STUDIES 1 AND 2

Athletes encounter a wide variety of situations during competition. Some of those situations may create more anxiety within the athlete than other situations.

The main purpose of this study is to determine what kind of situations individual athletes find anxiety-provoking. By completing this questionnaire thoughtfully and honestly, you can contribute to the knowledge in this area.

Only the researchers will have access to your individual responses, which will not be seen by your coach. Please do not identify yourself.

PART I

Please provide the following information.

*Please indicate whether you have previously completed this questionnaire: Yes ( ) No ( )

1. GENDER— (Check One) Male ( ) Female ( )

2. AGE— Years (__) Months (__)

3. INTERCOLLEGIATE SPORT (Check One)

Basketball ( ) Field Hockey ( ) Ice Hockey ( )
Soccer ( ) Swimming ( ) Volleyball ( )

4. TOTAL NUMBER OF YEARS COMPETING IN THIS SPORT (AS IDENTIFIED IN QUESTION 3).

0-2 ( ) 3-5 ( ) 6-8 ( ) 9-11 ( ) 12-14 ( ) 15+ ( )

5. YEARS OF ELIGIBILITY REMAINING WITH CURRENT TEAM (Check One)

0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

6. PREVIOUS REPRESENTATIVE EXPERIENCE (IN SPORT IDENTIFIED IN QUESTION 3).

Junior High School Representative________( )
High School Representative____________( )
District/Regional Representative_________( )
Provincial Representative_____________( )
National Representative______________( )
Other_________________________( ) Please Specify_____________________________
____
____

7. REGULAR PLAYING POSITION WITH CURRENT TEAM (e.g. Goaltender, Guard, Setter etc.)

____

8. OUTLINE THE MAJOR ROLE YOU PERCEIVE YOURSELF AS PLAYING FOR THE TEAM IN THE PLAYING POSITION INDICATED._____________________________

____
____

PART II

Please identify and describe up to five (5) typical situations, associated with competition in your sport, within which You experience greatest anxiety. Please rank the situations in order, with rank #1 producing most anxiety. Please also provide your reason for identifying each situation.

REMEMBER: ANXIETY is defined as ...

*a state of mental uneasiness or distress.

RANK ( ) SITUATION:____________________

PERSONAL REASON FOR ANXIETY:____________________

RANK ( ) SITUATION:____________________

PERSONAL REASON FOR ANXIETY:____________________

RANK ( ) SITUATION:____________________

PERSONAL REASON FOR ANXIETY:____________________

RANK ( ) SITUATION:____________________

PERSONAL REASON FOR ANXIETY:____________________

RANK ( ) SITUATION:____________________

PERSONAL REASON FOR ANXIETY:____________________

APPENDIX B

OPTIMAL ORDER FOR PAIRED COMPARISONS OF 15 STIMULI

Optimal Order for Presentation of Pairs

1- 2	11- 9	9-14	3- 9	9- 6
15- 3	10- 1	10-13	2-10	10- 5
14- 4	4- 3	11-12	15-11	11- 4
13- 5	5- 2	1- 5	14-12	12- 3
12- 6	6-15	4- 6	13- 1	13- 2
11- 7	7-14	3- 7	7- 6	14-15
10- 8	8-13	2- 8	8- 5	1- 8
9- 1	9-12	15- 9	9- 4	7- 9
3- 2	10-11	14-10	10- 3	6-10
4-15	1- 4	13-11	11- 2	5-11
5-14	3- 5	12- 1	12-15	4-12
6-13	2- 6	6- 5	13-14	3-13
7-12	15- 7	7- 4	1- 7	2-14
8-11	14- 8	8- 3	6- 8	15- 1
9-10	13- 9	9- 2	5- 9	8- 9
1- 3	12-10	10-15	4-10	7-10
2- 4	11- 1	11-14	3-11	6-11
15- 5	5- 4	12-13	2-12	5-12
14- 6	6- 3	1- 6	15-13	4-13
13- 7	7- 2	5- 7	14- 1	3-14
12- 8	8-15	4- 8	8- 7	2-15

Table should be read vertically by columns.

(Ross, 1934)

APPENDIX C

ABBREVIATED STUDY 3 DATA COLLECTION INSTRUMENT

Athletes encounter a wide variety of situations during competition. Some of those situations may create more anxiety within the athlete than other situations.

The main purpose of this study is to determine how athletes view certain situations which are anxiety-provoking. By completing this questionnaire thoughtfully and honestly, you can contribute to the knowledge in this area.

Only the researchers will have access to your individual responses, which will not be seen by your coach. Please identify yourself by providing your I.D.#________.

PART I

Please provide the following information.
*Please indicate whether you have previously completed this questionnaire: Yes ( )
No ( )

1. GENDER— (Check One) Male ( )
Female ( )

2. AGE— Years (__) Months (__)

3. INTERCOLLEGIATE SPORT (Check One)

Basketball ( )	Field Hockey ( )	Ice Hockey ( )
Soccer ( )	Swimming ( )	Volleyball ( )

4. TOTAL NUMBER OF YEARS COMPETING IN THIS SPORT (AS IDENTIFIED IN QUESTION 3).

____

5. YEARS OF ELIGIBILITY REMAINING WITH CURRENT TEAM (Check One)

0 ( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

6. PREVIOUS REPRESENTATIVE EXPERIENCE (IN SPORT IDENTIFIED IN QUESTION 3).
Junior High School Representative________( )
High School Representative____________( )
District/Regional Representative________( )
Provincial Representative____________( )
National Representative_____________( )
Other________________________( ) Please Specify____________________________
____
____

7. REGULAR PLAYING POSITION WITH CURRENT TEAM (e.g. Goaltender, Guard, Setter etc.)

____

8. OUTLINE THE MAJOR ROLE YOU PERCEIVE YOURSELF AS PLAYING FOR THE TEAM IN THE PLAYING POSITION INDICATED.____

____
____

PART 2

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE STARTING

The following two situations are examples of different types of threatening situations in which most individuals would experience heightened levels of mental uneasiness or distress. However, as you will see, the reason for anxiety in each situation is very different.

Situation 1: Your professor has asked you to give an oral presentation of your work to a large audience whose knowledge of the subject matter is superior to yours.

Situation 2: While awaiting the arrival of a close friend who is over one hour late, you hear on the radio that a serious accident has taken place on the highway along which your friend was travelling.

It would be likely that in the first situation you would be worried about how well you were going to perform in front of such a large knowledgable audience. In the second situation, however, although there is no personal threat, you would probably still experience anxiety when worrying about the safety of your friend. Therefore, if you were asked to rate the similarity of the situations according to the similarity of the 'types of threat', you would probably rate the two situations to be quite dissimilar. If, however, the second situation had stated that you were about to go into an important job interview, you would likely have perceived this situation as being more similar to the 'presentation situation' than you would have done with the 'accident situation'.

Listed in the following pages are pairs of anxiety producing game situations that you may encounter during the course of the season. Please rate the similarity of each pair on a scale from 0 (not at all similar) to 8 (very similar). Make your ratings according to how similar you perceive the 'reasons for anxiety' in each pair of situations.

To familiarize yourself with all 15 situations, please read the list on the following page before you start to make your similarity ratings.

****

UNLESS STATED OTHERWISE, PLEASE ASSUME THAT EACH SITUATION TAKES PLACE AT A CRUCIAL PERIOD OF AN IMPORTANT GAME.

****

(1) The referee makes an error on the call and you are given a two minute minor penalty for an infringement which you did not commit.

(2) You commit an undisciplined penalty and during the resulting powerplay the opposition scores to take the lead.

(3) After committing several unforced errors the coach benches you for the rest of the game.

(4) The coach openly criticises you in full view of both team mates and spectators.

(5) During an overtime period you are caught up the ice and see an opponent get a breakaway with only the goaltender to beat.

(6) Late in a tied game the coach requests that you take a face off in your defensive zone.

(7) You are pulled down on a breakaway and awarded a penalty shot which you feel you must score to win the game.

(8) You miss a penalty shot at a crucial stage in the game.

(9) You are chasing the puck into the corner with your back to the play. You are aware that an opponent is rapidly closing down but you cannot avoid the check.

(10) An opponent winds up for a slap shot and in order to prevent the puck from hitting your net you must go down and block the puck with your body.

(11) While attempting to break out of your own end you carelessly give away possession inside the blue line resulting in a goal for the opposition.

(12) While in your defensive end you lose the opponent you were checking and realise that if he were to receive a pass an excellent scoring opportunity would be presented.

(13) You are required to kill the last minute of a minor penalty late in the game.

(14) An excellent scoring opportunity arises and you find yourself alone in the slot with only the goaltender to beat. However, you bury the puck into the goaltender's pads allowing an easy save.

(15) Late in a tied game you get a breakaway and have only the opposition's goaltender to beat.

****

NOTE THAT UNLESS STATED OTHERWISE, ALL

OF THE SITUATIONS TAKE PLACE AT

A CRUCIAL PERIOD OF AN IMPORTANT GAME

****

*****PLACE A CHECK MARK (✓) ABOVE THE SIMILARITY RATING.*****

(1) The referee makes an error on the call and you are given a two minute minor penalty for an infringement which you did not commit.

vs

You commit an undisciplined penalty and during the resulting powerplay the opposition scores to take the lead.

Not at all Similar								Very Similar
___	___	___	___	___	___	___	___	___
0	1	2	3	4	5	6	7	8

(2) Late in a tied game you get a breakaway and have only the opposition's goaltender to beat.

vs

After committing several unforced errors the coach benches you for the rest of the game.

Not at all Similar								Very Similar
___	___	___	___	___	___	___	___	___
0	1	2	3	4	5	6	7	8

(3) An excellent scoring opportunity arises and you find yourself alone in the slot with only the goaltender to beat. However, you bury the puck into the goaltender's pads allowing an easy save.

vs

The coach openly criticises you in full view of both team mates and spectators.

Not at all Similar								Very Similar
___	___	___	___	___	___	___	___	___
0	1	2	3	4	5	6	7	8

(104) After committing several unforced errors the coach benches you for the rest of the game.

vs

An excellent scoring opportunity arises and you find yourself alone in the slot with only the goaltender to beat. However, you bury the puck into the goaltender's pads allowing an easy save.

Not at all Similar — Very Similar

__ __ __ __ __ __ __ __ __
0 1 2 3 4 5 6 7 8

(105) You commit an undisciplined penalty and during the resulting powerplay the opposition scores to take the lead.

vs

Late in a tied game you get a breakaway and have only the opposition's goaltender to beat.

Not at all Similar — Very Similar

__ __ __ __ __ __ __ __ __
0 1 2 3 4 5 6 7 8

****

PLEASE TURN TO THE FOLLOWING PAGE AND READ THE

INSTRUCTIONS CAREFULLY BEFORE COMPLETING PART 3

****

PART 3

ON THE FOLLOWING PAGE PLEASE RANK THE 15 SITUATIONS ACCORDING TO THE AMOUNT OF ANXIETY YOU WOULD EXPERIENCE IN EACH. A RANK OF 1 SHOULD BE GIVEN TO THE SITUATION IN WHICH YOU WOULD EXPERIENCE THE MOST ANXIETY, AND A RANK OF 15 FOR THE SITUATION IN WHICH YOU WOULD EXPERIENCE THE LEAST ANXIETY. THE USE OF TIED RANKS IS NOT PERMITTED. IN OTHER WORDS, YOU CANNOT GIVE TWO OR MORE DIFFERENT SITUATIONS THE SAME RANK.

RANK (1 = most anxiety, 15 = least anxiety)

____ The referee makes an error on the call and you are given a two minute minor penalty for an infringement which you did not commit.

____ You commit an undisciplined penalty and during the resulting powerplay the opposition scores to take the lead.

____ After committing several unforced errors the coach benches you for the rest of the game.

____ The coach openly criticises you in full view of both team mates and spectators.

____ During an overtime period you are caught up the ice and see an opponent get a breakaway with only the goaltender to beat.

____ Late in a tied game the coach requests that you take a face off in your defensive zone.

____ You are pulled down on a breakaway and awarded a penalty shot which you feel you must score to win the game.

____ You miss a penalty shot at a crucial stage in the game.

____ You are chasing the puck into the corner with your back to the play. You are aware that an opponent is rapidly closing down but you cannot avoid the check.

____ An opponent winds up for a slap shot and in order to prevent the puck from hitting your net you must go down and block the puck with your body.

____ While attempting to break out of your own end you carelessly give away possession inside the blue line resulting in a goal for the opposition.

____ While in your defensive end you lose the opponent you were marking and realise that if he were to receive a pass an excellent scoring opportunity would be presented.

____ You are required to kill the last minute of a minor penalty late in the game.

____ An excellent scoring opportunity arises and you find yourself alone in the slot with only the goaltender to beat. However, you bury the puck into the goaltender's pads allowing an easy save.

____ Late in a tied game you get a breakaway and have only the opposition's goaltender to beat.

APPENDIX D

WEIGHT MATRIX EMPLOYED TO CALCULATE WEIGHTED KAPPA

		Similarity rating on second testing session								
		0	1	2	3	4	5	6	7	8
Similarity rating on first testing session	0	0	0	.5	1	2	3	4	5	6
	1	0	0	0	.5	1	2	3	4	5
	2	.5	0	0	0	.5	1	2	3	4
	3	1	.5	0	0	0	.5	1	2	3
	4	2	1	.5	0	0	0	.5	1	2
	5	3	2	1	.5	0	0	0	.5	1
	6	4	3	2	1	.5	0	0	0	.5
	7	5	4	3	2	1	.5	0	0	0
	8	6	5	4	3	2	1	.5	0	0